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Supersize me

Monitors. Some choose to neglect them, but that's like buying a Porsche and then painting over your windscreen. If you're going to invest in a beast machine for your games, you can't truly appreciate them unless they're playing on a big, sharp, gorgeous display.

And I used to think I knew what big, sharp, gorgeous monitors were, what with my trusty 19" Sony Trinitron. And then, as you do, we thought it was time to do an LCD monitor roundup.

Let me put this eloquently: OMG.

We put the call out for 'the fastest and the biggest', because you either want fast response times, for the 1337 FPS players, or you're one who wants to be absorbed by the game world, and for this size is everything.

This is *Atomic*, so we put down the superfast 19" screens, added the bigger 20"+ sizes, and jumped on the opportunity to play with some of the newer widescreens.

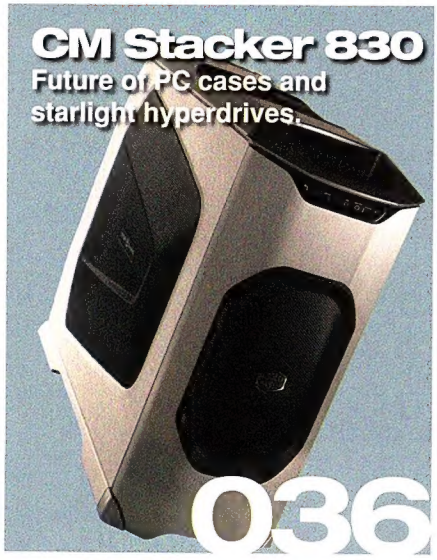
And then the cheeky buggers at Dell decided to send us their trump card. All 30" of it. Ok, *this* was new. And big. My gosh, it was big. It was big in all the ways the word 'big' was intended to describe. Want to see for yourself? *Page 42* is calling you.

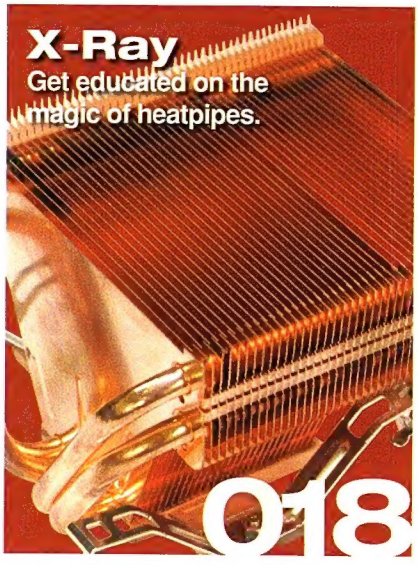
Better yet, we were so impressed and we knew you'd like one of these as much as us, that we pulled a few strings and Dell is graciously giving away one of these stupendously big monitors, *free*, as a subscription prize. So if you're not a subscriber, now is as good a time as any. And if you are, no problem! We have you sorted too. See *page 58* for details.

Finally, Atomic Live 2005 went off far better than we could ever have hoped. Thankyou everyone for coming along. You made the day what it was, and the flood of positive feedback about it means we'll be doing it again. You can see a re-cap of the highlights starting from *page 52*.

2006 is here. Hope you recovered well from the new years, and you're playing with some sweet new gear. Enjoy.

Ashton Mills
amills@atomicmpc.com.au





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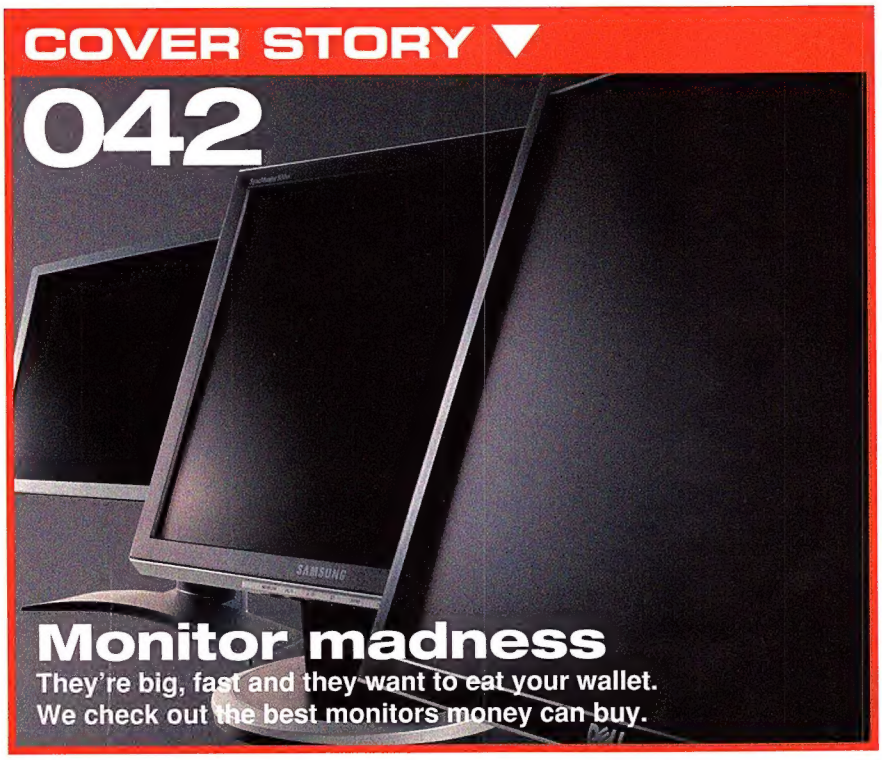
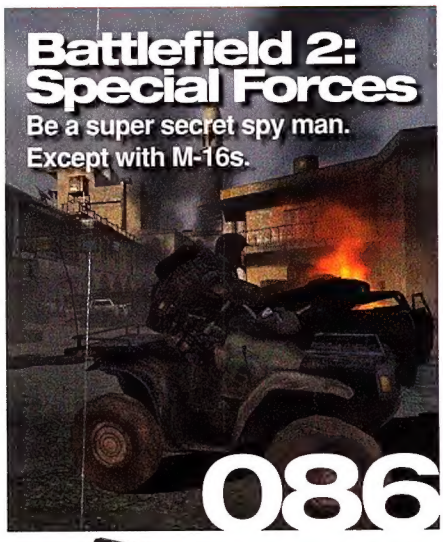
COVER STORY ▼



042

Monitor madness

They're big, fast and they want to eat your wallet. We check out the best monitors money can buy.



Battlefield 2: Special Forces

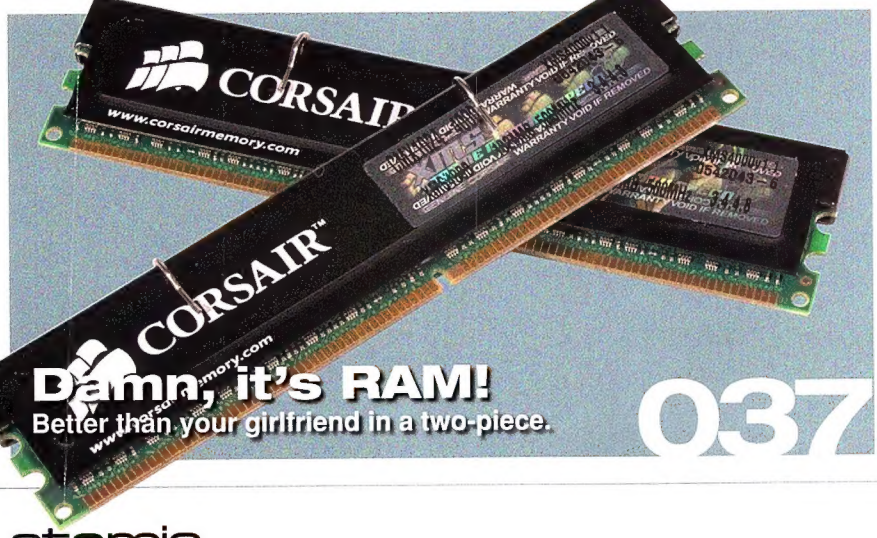
Be a super secret spy man. Except with M-16s.

086

Pentium 4 995 EE

Can it match the supreme Athlon 64 FX-60? Find out.

034



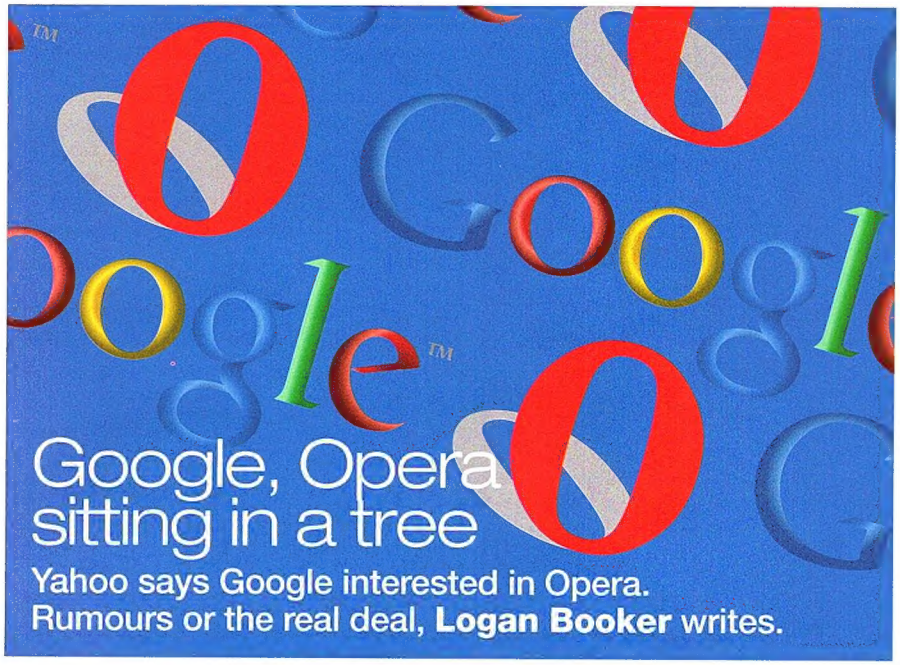
Damn, it's RAM!

Better than your girlfriend in a two-piece.

037

update

Tech news you can't live without. Seriously, it's that awesome.



Google, Opera sitting in a tree

Yahoo says Google interested in Opera. Rumours or the real deal, Logan Booker writes.

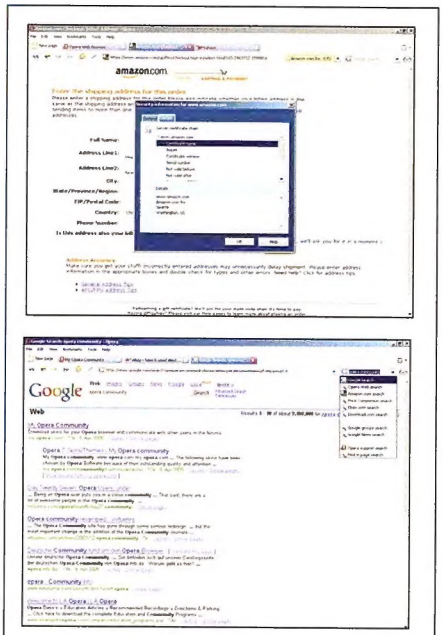
Rumour is currently rampant that Google is interested in entering the Web browser market in some form or another. This rumour gained some momentum recently, thanks to Yahoo Europe's current CEO Pierre Chappaz. In November 2005, Chappaz wrote in his blog (translated from French) that 'According to a source generally informed very well, Google would be about to repurchase [sic] the Opera navigator'.

This goes against the more mainstream speculation that Google is after a Gecko-based browser like Firefox (or even Firefox itself), and Chappaz himself warned that the rumor was to be taken with 'precaution'. What makes the rumour out of place is that back in January 2005, Google hired Firefox's lead coder Ben Goodger to do pretty much what he was already doing – working on Firefox. At the time, no one could figure out exactly what Google was up to – perhaps it wanted to support the open-source movement, or the plight of Firefox against Microsoft's market-dominating Internet Explorer. Whatever the reason then, Firefox today has captivated close to 10% of the browser market. That's considerable considering IE owns the other 90%, along with the likes of Safari and, of course, Opera. It's only been in the past few years that *any* browser has managed to make an impact on Internet Explorer's almost total domination of the market.

So why would Google be looking at Opera, when Firefox has more market share and Google already has a vested interest in its lead programmer? The answer is that it isn't.

It's predicted that we'll be doing more browsing on mobile devices in the next ten years than on our PCs, so the mobile browser market is currently ripe for competition. No one has yet hit the perfect formula of compact size versus functionality, but it's only a matter of time before someone comes up with a way of having the best of both worlds.

It is for this reason that Google is more than likely interested in Opera's advanced mobile browser. This is where Opera is easily the best. According to the company, back in 2004, Opera Mobile reached 1 million downloads, and that number should be much larger today. Opera even offers a subscription service to a proxy server that reformats web pages to a more compact size, minimising data download rates. This is in addition to small screen rendering technology in Opera Mobile itself.



Opera and Google sitting in a tree... well a browser and a search engine can't really sit.

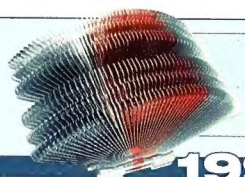
Opera has denied that anything is going on and Google has yet to say anything damning, but it's not at all crazy that Google would want to secure its place on mobile devices. It's a platform Microsoft has yet to make an appearance on, as far as browsers go, and if Google was to acquire Opera it would give them a massive head start on future competition.

Aren't rumours fun?

THEN & NOW

#008 Heatsinks

Heatsinks have become a must-have components in the PCs of today. Unfortunately, they haven't followed the trend of CPUs, which are getting smaller. No, heatsinks have just become bigger, badder and ridiculous.



After years of seeing the same, boring block heatsink and fan, Korean-startup Zalman released its Super Flower range of silent CPU coolers. It was beautiful, had copper and aluminium and kind of worked. We were just glad for the change.

1980s

Back in the '80s heatsinks were used for big industrial PC jobs, and often included complex mineral oil or water-cooling to keep things at a reasonable temperature. Processors really weren't fast enough to justify any need for cooling.

1990s

It wasn't until the '90s that we started seeing low-profile, almost token heatsinks on CPUs. You could have taken them off and your CPU would have been fine – it wasn't until the original multiplier-based CPUs hit that heatsinks became a household (well, geek household) name.

1999

New Revolution

Finally, some hard specs on Nintendo's next-gen console Revolution are out. Logan Booker writes.

The technical specifications for Nintendo's Revolution were released on the Net not long ago, and it was clear from its single CPU and modest memory size that the new console will not compete head-on with Microsoft's Xbox 360 or Sony's PlayStation 3.

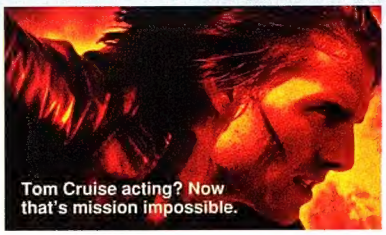
Currently, the Revolution's IBM 'Broadway' processor will be clocked around twice as fast as the CPU in the GameCube, while the 'Hollywood' graphics chip from ATI will be an updated version of today's generation of RADEON cores, so we can expect performance in the ballpark of the R420 (X800) and R520 (X1800). As for available RAM, online sources suggest 64MB to 128MB, but this has yet to be set in stone. Finally, the Revolution will play DVDs, but not out of the box – this extra functionality will need to be purchased as an optional extra.

According to developers who have had a chance to check out early development kits of the console, Revolution is not that much different to the GameCube. The new controller and the updated hardware are the only real things that set it apart, and this will in turn make it easy to create content on the platform, as well as port from the original GameCube, or even to it. This means that it's possible that Revolution will be backward-compatible with the GameCube – a fact Nintendo has pretty much confirmed.

Nintendo aims to embrace a market after a cheaper console, without the bells and whistles of the next-gen stuff. That's not to say that the Revolution won't be a great piece of hardware, but Nintendo will need to not only build on its catalogue of franchises, but innovate and develop IP also to stand strong in the next-gen console market.

The new, remote-like controller and the console's in-built, forward-looking hardware support for 802.11b/g are proof that this is likely what Nintendo has in mind.

short circuits



Want the Mission Impossible, super-spy feeling? Then self-destructing text messages might be for you. UK company StealthText has created a service that allows you to do just that, as long as your willing to subject the recipient to the company's applet, downloaded via WAP. Without it, users can't read the messages you send them, which is quite possibility the best protection you can get.

Free open-source browser Firefox 1.5 has made its debut, sporting a faster rendering engine, better support for complex pages and improved security. The release has further cemented Firefox's reputation as a good alternative to Microsoft's Internet Explorer, which hasn't had any significant updates since the release of Windows 2000.

Talking about updates to IE, Microsoft plans to release a public beta of Internet Explorer 7 early next year. If you haven't had a chance to check it out, it has some interesting new features including a phishing site blacklist, tabbed browsing and support for Vista's many GUI enhancements.

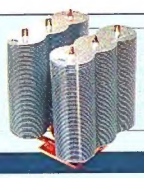
Google plans to add special search functionality for music to its search engine. According to the company, the sheer number of music-related searches prompted the addition of the feature.

While everyone was trying to innovate, Global Win stuck to the tried-and-true formula, coming out with the FOP-38. It was the overclocker's favourite, the massive 7000rpm Delta fan cooling pretty much everything you threw at it. It was also the FOP-38 that gave us an appreciation of better-designed and quieter HSFs.

2000

When Zalman brought us the Super Flower, it opened the flood gates on heatsink design. From everywhere there came new and interesting heatsinks, some that worked and some that didn't. Among them was Thermaltake's excellent Golden Orb series, which spawned the now famous Dragon Orb 3.

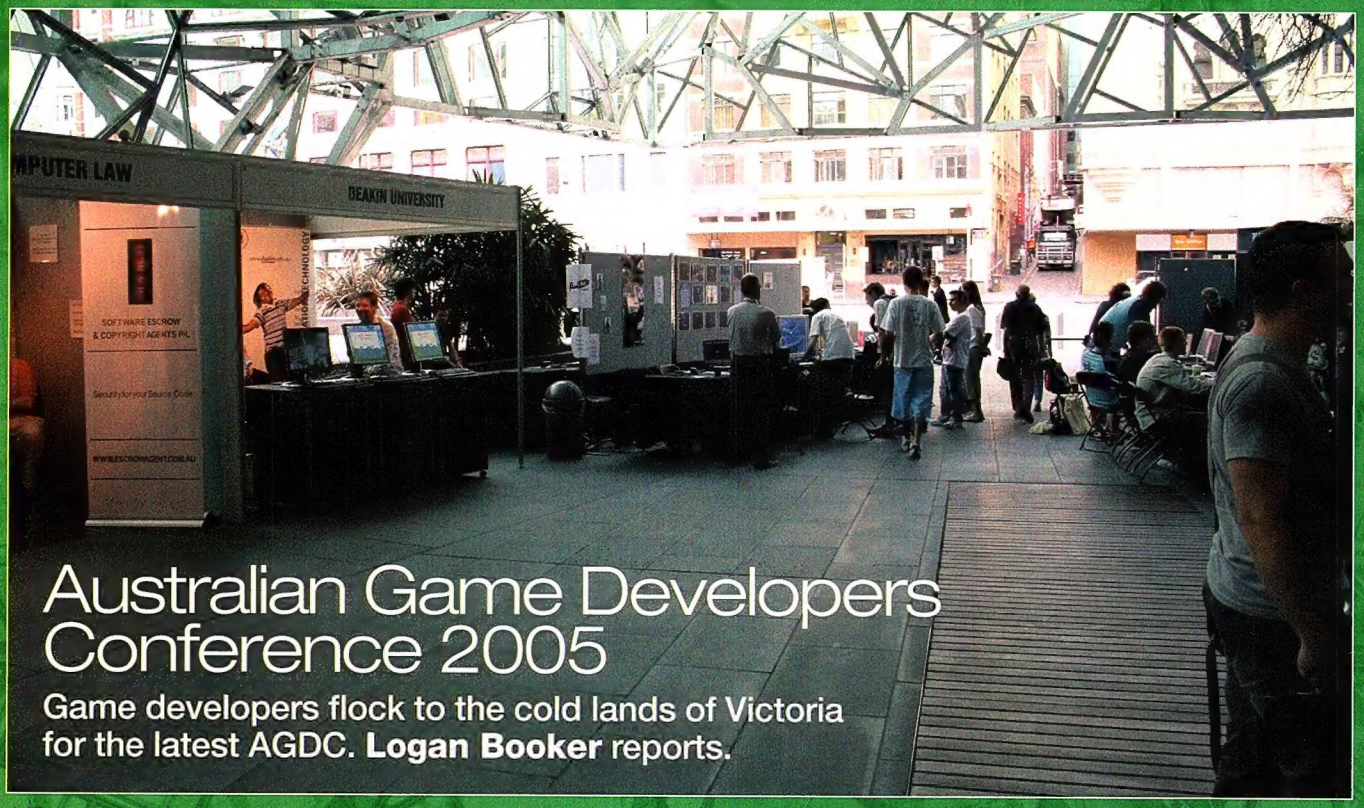
2001



Finally today, we have engineering feats of insanity, like Thermaltake's Sonic Tower – a heatsink that defies logical explanation but looks damn cool. Water-cooling however has seen rising interest, and now it's the size of your pump, not your HSF, that makes the difference.

2005

Heatsinks – they'll always be cool. Join us next month when we tackle multiple, equal-level elite mobs solo to bring you that Timbermaw leatherworking recipe you always wanted!



Australian Game Developers Conference 2005

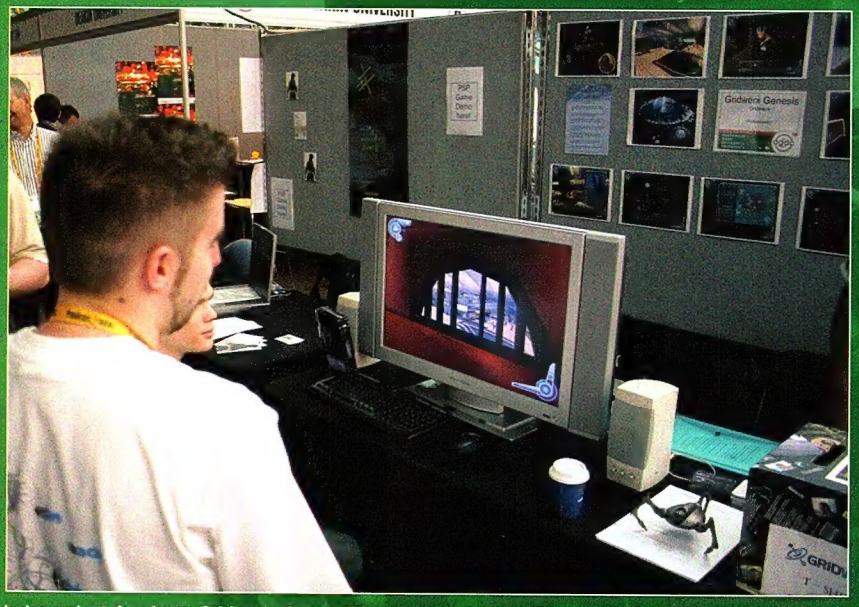
Game developers flock to the cold lands of Victoria for the latest AGDC. Logan Booker reports.

Another year, another AGDC. Despite being a bit low key compared to previous years, AGDC 2005, held in Melbourne's Federation Square, still boasted a top line-up of local and international developers along with the usual army of budding programming and multimedia students.

In attendance were many famous faces, including the likes of Ian Livingstone, founder of Games Workshop and currently at Eidos; Blizzard's Chris Metzen and Rob Pardo, designers of games including Warcraft and Starcraft; Jeff Pobst, lead technical game manager for Xbox; Don Daglow from Stormfront Studios; BioWare CEO Dr Ray Muzyka and plenty more.

AGDC 2005 took place over three days, the first being a special day for students, and the last two catering for all other attendees. A typical AGDC is made up of several events, the most prominent being the numerous panels on game design, business and development, with several keynotes mixed in. AGDC 2005 was no different.

This year's event was broken up into two sections – the panel area and the exhibition. While the panel area speaks for itself, the AGDC expo is a more complicated beast. It holds stands for various universities, game developers and hardware vendors, as well as a section for independent local developers to show off their latest creations (and be rewarded for them). Blizzard also had a stand at the event, manned by two of the company's HR personnel. They did much to clarify the hiring process of Blizzard, field questions and to basically recruit talent here in Australia.



Independent developer Gridwerx shows off its cyberpunk game Genesis at the AGDC expo.

Day two

Day two of AGDC held some great talks, including Blizzard's vice president for creative development Chris Metzen on World of Warcraft and the role previous games played in its creation, and Jeff Pobst, lead technical game manager for Xbox, on XNA Studio, a development platform for creating games.

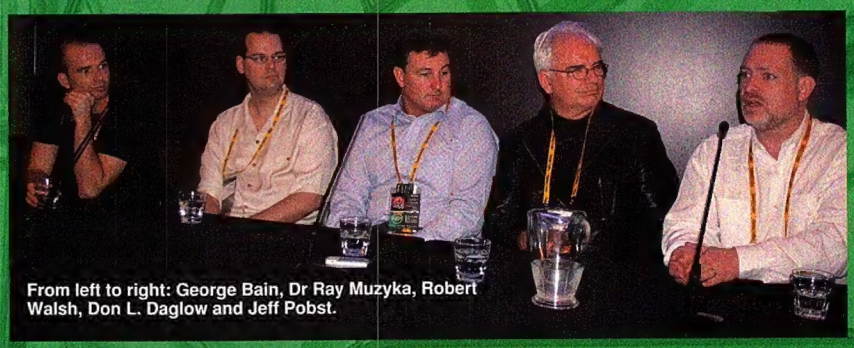
One of the first talks was actually a panel comprised of gaming journalists, including Stuart Clarke of *GamePro* and *Australian Personal Computer's* John Gillooly. Also present was US journo Cliff Edwards from *BusinessWeek*, who was kind enough to explain his attitudes toward gaming news, including the best way to pitch stories and the sort of things journalists look out for when looking for good stories.

This was followed by a presentation on XNA by Jeff Pobst, who revealed that the software development environment for games is a two-part affair, and rests on top of Microsoft's Visual Studio. XNA Build, he said, is designed for content management, to streamline the compilation of code and resources, while XNA Studio is the environment in which game creators – not just coders – can work to manage a project. Pobst said the beta of XNA Studio will be out by the next Game Developers Conference in the US, while XNA Build is already available in the latest version of Visual Studio. He also mentioned briefly something called 'Live on Windows' which we'll be checking out in more detail in future issues.

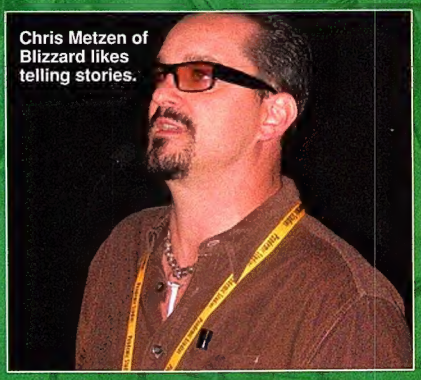
Chris Metzen was next in the list of speakers, and he gave a informative talk on the importance of story development. Metzen emphasised the importance of fleshing out small details, especially if you plan to use a story in more than just one game, and that a good story can help answer a lot of fundamental game design questions. He did admit however that it was a balancing act – don't go overboard or the game itself will never get done.

The last big talk for the day was from Dr Ray Muzyka, joint CEO of BioWare. Muzyka spoke mainly on the importance of community in helping a developer prosper. He cited the BioWare forums and its many knowledgably users as a good example of what a community can be. He also talked about BioWare and Pandemic's recent agreement to join forces, along with investor Elevation Partners, and what it meant for the two developers and for the industry. Muzyka was quick to point out that the group of three companies made them the largest independent developer in the world. There was some speculation that the newly formed conglomerate could very well become a publisher. While Muzyka didn't dismiss the idea, he did say that they had a lot of respect for publishers and distributors and had no plans to put those relationships at risk. There was also talk of online distribution, as well as a massively multiplayer online game. Again, while there was no confirmation, Muzyka didn't rule anything out.

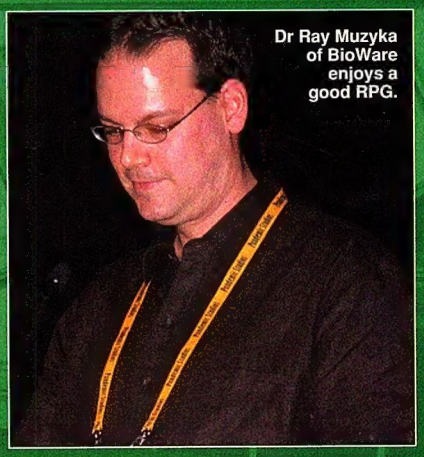
Day two was capped off with the PlayStation2 cocktail dinner, which not only included cocktails, but nerf guns. You can never have enough fun with alcohol and toy weaponry.



From left to right: George Bain, Dr Ray Muzyka, Robert Walsh, Don L. Daglow and Jeff Pobst.



Chris Metzen of Blizzard likes telling stories.



Dr Ray Muzyka of BioWare enjoys a good RPG.

Jeff Pobst is in love with XNA.

Game journalists talk shop.

While 2005 may have had the smallest AGDC, the names were more than big enough to make the event informative and educational.

Day three

The final day of AGDC was much like the second. The expo hall continued to attract outside visitors and a few of the small-time independent studios had a chance to show off their latest game builds – some of which, like Brisbane-based Gridwerx's Genesis looked fairly neat. The speaker's area also haboured a few gems – Blizzard lead designer Rob Pardo, and a panel containing influential people in the next-gen console arena.

Rob Pardo, like Metzen, used Blizzard's previous and current games to explain his points. However, instead of talking about story and character, he spoke of the importance player control and pacing have in a game. Pardo explained that the first two to five hours of a game must have good pacing and that 'control is king'. Both of these he stressed can only be perfected with extensive

Irrational in Canberra is just one of many great developers based in Oz.

Lecturers from the Academy of Interactive Entertainment champion the prototyping and educational uses of 3D engines.

play testing and that execution was much more important than innovation. Pardo stated that there's no need for a developer to innovate with every single game they make.

Although Pardo was insightful, by far the most intriguing presentation of the day was the next-generation console panel that featured names like Dr Ray Muzyka, Don L. Daglow from Stormfront Studios and Jeff Pobst. The panel was tasked by moderator and journalist Jason Hill to answer various questions on next-gen games development.

When asked about the spiralling costs of games development, Pobst blamed the marketplace – better hardware means better games, and the content creation required for such powerful platforms is massive. The panel agreed that many games require more artists and writers than ever before and techniques such as motion-capture for animation are no longer optional extras – they're required. Jeff Pobst made the comment that 'it's all about shaders' – next-generation graphics. Most of the costs associated with new games are from labour, the panel said.

> **"...there's no need for a developer to innovate with every single game..."**

The topic of outsourcing was broached, and the panel agreed that it is necessary, but there needs to be a balance because outsourcing means relinquishing some creative control. The panel added that new intellectual property would find its way onto the next-generation consoles, thanks to the power of the hardware.

Day three concluded with a keynote by John De Margheriti, chairman of the Academy of Interactive Entertainment and Australian developer Micro Forte.

BioWare's Jade Empire brought role-playing to a new level on the Xbox.

AGDC and the future

Since 1999, the Academy of Interactive Entertainment (AIE) has been the host of AGDC. This year however marked the end of AIE's ownership of the event, and it will hand the reins over to the Game Developers Association of Australia (GDAA). Evelyn Richardson, president of GDAA, said at the conference that the association would be working to invite more game publishers to the event, as well as opening up AGDC to the whole of Australasia. The plan is to make the event bigger than what it has been in the past few years and expand its influence.

Richardson also mentioned the possibility of hosting AGDC in Sydney or even Brisbane in the next few years. Although Sydney would seem the logical choice considering halfway between Brisbane and Melbourne, Brisbane is home to a number of big developers, like Pandemic, and the state's government is far more supportive of the games industry.

Is your notebook this popular?

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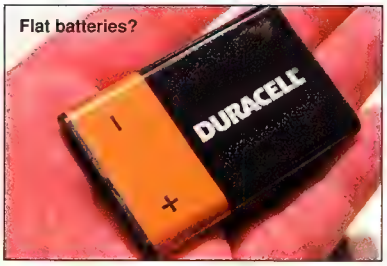
short circuits



NEC has come to market with a new, super thin battery. The 300-micron thick organic radical battery (ORB), as it is known, makes use of a flexible polymer as its cathodes, and can charge in as little as 30 seconds. While jokes of flat batteries are flying fast, this obviously has uses in the ever-expanding mobile devices space. We can't wait for the first flat PC.

MacGyver would be proud that a Clarkson University engineer in the States, one Stephanie Schuckers, made the news by outwitting some of the world's most advanced biometric security devices – designed to be accessed only through fingerprint identification – with nothing more than a piece of putty. It's not as sensational as it sounds however, as this is actually her research – and her funding comes in part from the US Department of Defence.

Top 5 ...tenets of geekdom

5. If at first it doesn't fit, force it.
4. If you leave it long enough, somebody else will do it.
3. Anything worth doing is worth doing with minimal effort.
2. Work is just what you do between playing games.
1. Two of *anything* is always better than one.

future

Quenching your thirst for the latest technology and hardware

Your life on a disk

Holographic storage has been a holy grail for some time. Now, as Ashton Mills reports, it's just around the corner.

Last issue we reviewed the industry's first 500GB drives. No doubt by the end of the year we'll be looking at the first 1TB drive. We'll all be googly-eyed at how fantasmically big and fast a single disk can be. But if we really think about it, it's actually quite small.

In fact, why are we limited at all?

For our hard disks, it's a matter of density. We're rapidly approaching the stage where we simply can't pack the bytes in any tighter without impacting on adjacent sectors and making the media unreadable. So where do we go next?

Holographic storage, like most ideas, isn't new, but the technology to implement it is. The premise is simple. Instead of using just the surface of a disk to store information – as with platters in a hard drive or the substrate of a DVD – why not use the *whole* depth of the disk as a storage medium. Suddenly, the amount of information you can store comes down to how finely you can fiddle with molecules. Right now, it's not a lot, but the potential is enormous.

In fact, according to Mike Thomas, the pioneer of company Colossal Storage, it would be possible to store 100 terabytes on a 3.5-inch disk. That's 100,000 gigabytes, conceivably per platter, though the patents Colossal Storage have, apply to optical removable disks.

Whereas Colossal Storage hasn't yet brought a product to market, American storage giant Maxell recently did, using a technology developed by InPhase Technologies, a spin off of Bell Labs.

The technology used by Maxell takes a single laser beam and splits it into two beams – the 'signal' (carrying the data) and the reference beam. Where these two beams intersect in the recording medium, a hologram of approximately a million light and dark pixels is formed. The pattern is determined by a 'spatial light modulator', effectively the encoder/decoder. By adjusting the angle and wavelength of the source beam, many such holograms can be recorded in the same volume of material. Not only does this create extremely high data densities, but unlike traditional magnetic and optical storage that reads and writes bits sequentially, holographic media can read and write millions of bits at once, theoretically producing vast read and write throughput speeds.

Maxell has scheduled a 2006 release for the world's first holographic removable storage drive, with a single disk packing a not too shabby 300GB. Doesn't sound that big? According to Maxell, this is just the first generation product but the technology is capable of storing up to 1.6 terabytes per disk. And just to be clear, we're talking 5.25in disks here.

While the disks will reportedly go for US$120 for 300GB, the drive is currently prohibitively priced US$15,000. As with all new technologies, we can expect prices to drop as the technology matures. However with the more affordable Blu-ray and HD-DVD also round the corner, it could be a while before demand drives a new age of holographic based storage into our laps.

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The big picture behind technology and the world around us

Turning the industry around 360 degrees

Will the new power consoles kill of PC gaming once and for all? Tim Dean doesn't think so, but maybe he's just being overly optimistic.

By the time you read this, an army of Xbox 360s should be happily throbbing away in living rooms around the world. And throb they will. Between their multi-core Xenon CPUs and Xenos GPUs, the Xbox 360 is capable of some serious multithreaded computational power.

It's needless to say how remarkable modern games consoles are given their austere beginnings with the humble Magnavox Odyssey or revolutionary Atari 2600. But it is fascinating to note the slow but steady shift of computing power from the study to the living room. This is no accident. It's just a fact that Internet browsing, word processing and ripping audio CDs doesn't require a supercomputer. On the other hand, rendering realistic 3D graphics, simulating real world physics and outputting a high definition signal does take a significant amount of computational mojo.

Now, both you and I know that current and near future PCs are easily a match for an Xbox 360 in most departments, and it won't be long before PCs convincingly exceed the Xbox 360 in terms of CPU power and graphics. However, to build a PC with a high frequency multi-core CPU and an equivalent graphics card to an Xbox 360 will cost you several times as much as the wee- white console.

So, here we have these inexpensive computational powerhouses populating millions of homes around the world, and a platform that is relatively easy to develop for compared to the PC (a not unintentional by-product of it being created by the world's largest software developer).

So where does this leave the PC? This question scares the willies out of me sometimes. Even though I harbour respect for games consoles, and have enjoyed their offerings from time to time, I'm a PC gamer through and through. I simply prefer PC games. From strategy, to simulators, to RPGs, to the mods, I relish the complexity and versatility of the PC compared to the simplicity and accessibility of console games.

In 12 months time we'll have Windows Vista, and with it a boom in hardware upgrades. Then many home PCs will be an ideal gaming platform.

Yet nature abhors redundancy (not as much as she abhors a vacuum though...) – so why have two powerhouse games systems in the house when you can get by with one? For PC gamers the question answers itself – PCs are not as limited as consoles, and have greater flexibility, growth potential and while consoles briefly leapfrog PCs in terms of power, it's not long before PCs catch up.

However, for games developers, it's not so clear. The console market is so huge, and the power of the machines so great, that they risk sacrificing millions of potential sales if they only develop for PC and don't include a console or two in their line-up. As a result we've seen more and more console 'ports' to PC in recent years.

Even so, I don't think this is a death knell for PC gaming. In 12 months time we'll have Windows Vista, and with it a boom in hardware upgrades. Then many home PCs will have a powerful 3D card, and probably a multi-core 64-bit CPU to boot – which will make them an ideal gaming platform. There is also still a huge community of dedicated PC gamers, and they still demand the same PC-type games they loved from days gone by. If the big developers don't cater to these gamers, small developers will – and we've already seen this phenomenon in action with the increasing number of PC games coming out of small European developers.

This industry always moves along in cycles, such as simplicity vs. complexity and specialisation vs. generalisation, so while we're going through a specialisation and simplicity phase at the moment, it's only a matter of time before it shifts back again. And for my gaming sanity's sake, I hope it happens soon.

Tim's favourite PC game is Minesweeper.
tim@atomicmpc.com.au

atomicbio

Name **Dr Ian Davis**
Occupation **AI guru**
Websites **www.maddocsoftware.com**

Dr Ian Lane Davis, former technical director at Activision's Santa Monica studio, is widely acknowledged as one of the top Artificial Intelligence experts in the video game industry.

His direct game credits include: Empire Earth II: The Art of Supremacy (due 2006), Vivendi Universal Games; Empire Earth II (2005), Vivendi Universal Games; Dungeon Siege: Legends of Aranna (2003), Microsoft Game Studios; Empire Earth: The Art of Conquest (2002), Sierra Entertainment; Jane's Attack Squadron (2002), Xicat Interactive; and for Activision Publishing, Inc., Star Trek: Armada II (2001), Call to Power II (2000), Star Trek: Armada (2000), Civilization: Call to Power (1999), Battlezone (1998), Dark Reign: Rise of the Shadowhand (1998), and Dark Reign: The Future of War (1997).

Active in the games community, Dr Davis serves as a peer panel leader for the Academy of Interactive Arts and sciences peer panel for gameplay engineering and is a trusted advisor to key industry publishers.

Currently authoring the definitive AI and games textbook for academic and industry training along with academia's top AI researchers, in the autumn of 2005 he accepted a guest professorship at MIT, teaching 'Characters in Video Games', a 'topics in comparative media studies' course.

Recently appointed editor-in-chief of the Journal of Game Development, he is a highly sought speaker who presents in academic and game-focused venues and has been interviewed for print, online and television media.

Artificial Intelligence. There's no doubt that programming a machine with the ability to make choices based on external and internal stimuli is kind of hard, especially when it's for a game. A computer player has to provide a challenge that's not too hard but not that easy. Seeing as we have no clue how to do this, we talked with Mad Doc's Dr Ian Davis.

Atomic Let's start at the beginning – writing AI for games sounds like both the coolest and hardest of jobs. How did you get into it, and do you enjoy wrapping your head around it?
Ian Davis I've been writing games for myself since I was a kid, and as I got older I found AI to be the most interesting problem for games. Graphics are tough, to be sure, but it's well understood what it should look like and roughly how to get there (and most of it comes down to hardware). AI is the real frontier in games – each game needs different AI and there's no real blueprint for how to do it.

I was in grad school getting my PhD in Robotics (AI) when I realised that games presented all of the same cool AI challenges as robots but without requiring you to solve the hardware and low-level perception problems first. Someone I knew from high school had a contact at Activision and they put me in touch, and that was how I got started. It's been a long road from that to my latest game, Empire Earth II: The Art of Supremacy, and a lot of cool AI has been made in the process.

Atomic Where else do you apply the science outside of games?
ID I have a few other outlet. My company does a fair amount of research (military and other) on government grants. Also I am currently teaching a course on virtual characters at MIT in Cambridge, MA [in the US].

Atomic Speaking of which, AI in games today is one of the biggest letdowns. Fancy graphics, great story, and superb gameplay can all be let down by walnut-brained enemies. Why is this? Is it just impossible to actually create, or is the challenge creating intelligence that can run without taxing the CPU?
ID The biggest problem is that most companies simply don't devote enough resources to AI soon enough. Graphics get you noticed and bright and shiny things grab marketing people's attention, so AI gets put off until later – in fact, too late. Most companies also don't have someone trained to think about AI. Most AI programmers at most game companies wouldn't pass muster here. They may be good programmers, but there's a lot of AI in the universe, and if you haven't studied it, you'll end up reinventing the wheel.

Atomic On a related note, pathfinding in games often ranges from shockingly bad to total crap. Why is it so hard to calculate a path from A to B navigating around objects?
ID It's only hard when you don't know what you're doing (or if there are hundreds of units moving at once!). Basic pathfinding for a FPS or action game is a simple problem to solve, but navpoints is not the way to solve it. It's appalling how many game engines use that technique, which is mathematically guaranteed to suck.

You need to know how to decompose spaces into appropriate convex regions, how to do searches more advanced than bare bones AI, and how to handle units moving together or in proximity.

Atomic Where's the first place you start when designing AI for a game? Exactly, how do you build an 'intelligence' and what are the parameters that define it?

ID It depends a lot on the nature of the game. An FPS clearly has different needs than an RTS.

Of course, there are some commonalities – every game needs some sort of pathing system. If you can't move from A to B, you can't seem smart. To design this, you need to consider the structure of the underlying terrain. In a strategy game, you may be dealing with tiles underneath, while an FPS might have arbitrary polygons. The goal in any pathing system is to decompose the free spaces into the largest possible convex regions (convex because you'll be planning routes between cells and want to know you can move freely in a cell).

Once you've decomposed the space, you need to extract a directed graph from it on which to perform AI. Don't do AI directly on the geometry. The abstraction is important and gives you lots of flexibility for adding special connections. On the back end, you need some sort of rubber banding system to make the path look more natural, and some sort of dynamic collision avoidance to handle moving objects while still trying to follow your path. And you need to consider moving information with other units too.

On top of all that, you build your core AI systems. For an FPS, you need a character logic system (inference engine, production system, state machine, whatever). For an RTS, you'd need a system to allocate resources such as troops to tasks such as attacking the enemy or defending your base. In an RTS it becomes almost an operating system problem – how do I accomplish this, this and this, with just these resources.

The role of a game AI is to 'lose convincingly' says Dr Ian Davis, who promises there are games in development that 'will set new standards for AI'

Atomic In computer science terms, what exactly are the building blocks of an intelligence?

ID There's no formal definitive definition of an intelligence. You could enumerate things like a logic centre, memory, sensing, and the like. But to paraphrase and twist from Forest Gump, smart is as smart does. What I mean by that is that the goal of a game AI is (for an opponent) to lose convincingly. Your AI opponents are tools for drama and tension as much as they are intelligent agents. An AI must do things for logical reasons, but also be unpredictable. Most importantly, the player wants the AI to be good, so the player will actually help you out in some ways in coming up with explanations for the AI's behaviour.

There is no formal definitive definition of an intelligence. Smart is as smart does.

If you want to get down to it though, let's list some general components:

- Sensing. The AI must have some way to gather information about the world. If the AI has complete knowledge even when it shouldn't, the player will notice. But on the other hand, if the AI ignores the obvious (to a human … like another AI getting shot), the player will notice that too. And sensing isn't just raw data … you need to process it to get it into a manageable form. In a strategy game, having a list of known enemy units isn't enough; you need to suss out where the concentrations of enemies are and what areas are threatened by enemies before you can even begin deciding what to do.
- Logic. This varies by game type, but you clearly need to be able to choose a tactic, allocate troops, or perform some analysis of your data.
- Memory. An AI must behave in some coherent way with the knowledge it's already acquired. In a strategy game if you see enemy units but then they go away, the AI must be able to extrapolate where they might be or at least be aware that there's a threat out there.

Atomic How do you test a game's AI and make sure it doesn't do anything you didn't expect it to be able to do?

ID This can actually be very tough. On Empire Earth II: The Art of Supremacy we had testers working on it from day one at our offices in addition to the testers from Vivendi. In some ways you want the AI to be somewhat predictable, but you also can't make the testers' jobs too hard. That can create additional problems too.

There is no hard and fast rule, but the best thing to do is to make sure your AI engineers and your testers talk a lot. When the engineers implement something, the testers should shake it out right away.

Atomic Generally, what language do you build or write a game AI in?
ID Almost all games are written in C++. We have our own proprietary scripting language that's part of the MadAI suite of AI tools we use that is very fast and very efficient!

Atomic What games have you worked on and contain your work? Which are you most proud of?
ID I've worked directly on Dark Reign, Battlezone, Civilization: Call To Power, Call To Power 2, Star Trek Armada, Star Trek Armada 2, Dungeon Siege: Legends of Aranna, Jane's Attack Squadron, Empire Earth: The Art of Conquest, Empire Earth II and Empire Earth II: The Art of Supremacy, as well as several others. I've consulted on the AI for games such as The Suffering, Ground Control 2, The Sims 2, Lords of the Realm 3 and others I can't name. We also have a number of products currently under development. I'm proud of all of them, but especially excited about what we did with Empire Earth II and Empire Earth II: The Art of Supremacy. Some of our new games in development will set new standards for AI.

Atomic What games do you think are examples of exemplary AI? What games have such bad AI it makes you embarrassed to be in the field?
ID A game like The Sims did a lot for AI, and I'd love to see that sort of dynamic brought into a more traditional, more 'type A gamer' game. I've played a couple of RTS games where the AI didn't pay resources for its units, teched-up whenever you did, and knew what units you had automatically and then built exactly countering units for free. You can tell quickly that this is the case, and it ruins the game because none of the strategies that are part of playing the game make any sense against such an AI.

Atomic Do you think a program, regardless of complexity and the resource of the hardware on which it runs, in the future could achieve the equivalent of sentience?
ID Yes. Not soon, but eventually.

Atomic What's the most fun you've had designing AI – is there anything you've made that you can class as 'alive'?
ID I really had a great time designing the AI for Dark Reign. It was my first strategy game and I made lots of mistakes, but it was great to see the problem in that first light of understanding. On the other end, it's been great to see all of my techniques evolve into the far more sophisticated AI found in Empire Earth II. It's amazing how far I've come in building on my earlier ideas.

Atomic Do you have any anecdotes of in-game behaviour you didn't expect or surprised you?
ID At one point in developing Empire Earth II we noticed the AI wasn't breaching walls very well, so we turned that task over to one of our best engineers, and then in the next day's build the AIs just obliterated every wall with a vengeance bordering on the psychopathic. No defence was safe because the AI can target more wall segments at once than any human can hope to. We had to dial it back, because it was like cartoon termites tearing through walls like a buzzsaw!

Atomic What education do you need to get into this field, and even then if you have a degree, how do you actually get a job writing AI?
ID You need a BSc in Computer Science, minimum. A masters or PhD will help. You need to study path planning, search, logic and decision making, sensing, personalities, and a dozen other things. If you try to learn AI on the job, you'll always have too much pressure to finish a task RIGHT NOW, and you'll never get to explore all the options. In short, you won't learn efficiently.

Atomic When will Shodan become a reality?
ID Oh, you'll know when … you'll know … (evil laugh).

Atomic Getting into the game – if someone wanted to get into the field of AI, where should they start?
ID It's worth noting that lots of universities are starting to offer courses in game development If you're studying somewhere, let them know that a course in game AI would be valuable. If enough students say so, they'll find a way to offer one. I'm currently writing a book on the topic, so they'll have something to teach!

Atomic Thanks for your time Ian. In closing, is there anything you'd like to say?
ID I also just want to thank you and your readers for the opportunity to say hello. It's been a pleasure. And don't forget: The Art of Supremacy is due in 2006 – check it out!

Mad Doc was founded by Dr Ian Davis in 1999 and has developed hit games such as Empire Earth II.

x-ray

Looking at tech from the inside!

Pide to pipes

Heatpipes pervade all aspects of PCs today. So how do they work and why are they used? Ashton Mills gets cooking with the latest cooling fad.

Heatpipes. They're everywhere. Once upon a time this ubiquitous feat of engineering didn't exist in the home computing world. Well, except in laptops where they made their debut. But today, with the ever-present pursuit of cooling performance, they're in just about everything – CPU coolers, GPU coolers, motherboards and even power supplies.

And with good reason. Heatpipes can have a significant impact on the cooling performance of a device, and far outperform the thermal conductivity of metal alone.

But what exactly *is* a heatpipe, and how does it work?

Blessed are the bakers

G.M. Grover at the Los Alamos National Laboratory demonstrated the first heatpipe as we know it today back in 1963. The concept of moving heat from one location to another using a metal pipe reportedly dates back to humble bakers (yep, you know, those chaps that make *bread*) at the turn of the last century. Grover and his team were initially looking into the use of heatpipes to cool nuclear power cells on spacecraft, primarily because of their ability to operate in zero gravity. Today they form an integral component in just about any efficient cooling mechanism the world over, including as intended spacecraft used by NASA.

While the concept of heatpipes is relatively simple, optimising their design is most certainly a science.

The physics of cooling

Heatpipes work through the simple effects of evaporation and condensation. Heatpipes contain – often at low pressure – what's known as a *working fluid*. Apply heat to one end and, as the liquid reaches its boiling point, the liquid turns into a vapour and rises to the cooler end of the pipe. Here it condenses and, thanks to gravity or capillary action,

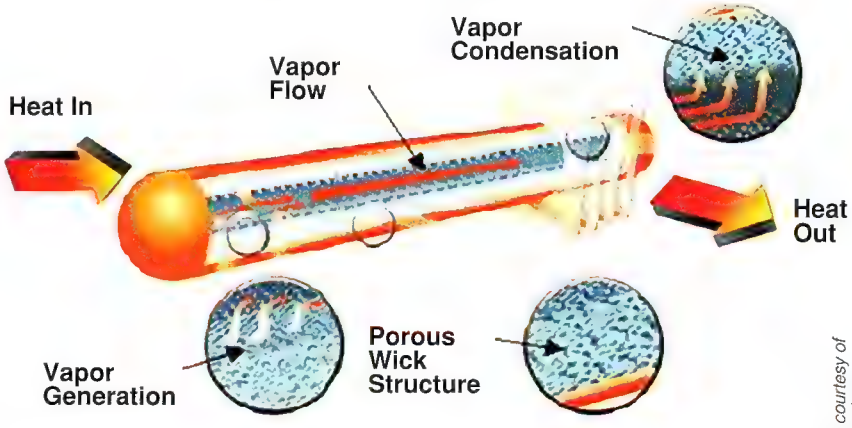
Two heatpipe designs relying upon the forces of gravity, the type of pipes you'll likely see in use on your CPUs and motherboards.

Against the flow

Gravity isn't just a concern for spacecraft when it comes to heatpipes. Many heatpipes in PC cooling devices use grooved wicks or similar (see diagram below) which is fine when orientated with the heatsource beneath the heatsink (where the liquid cools and condenses).

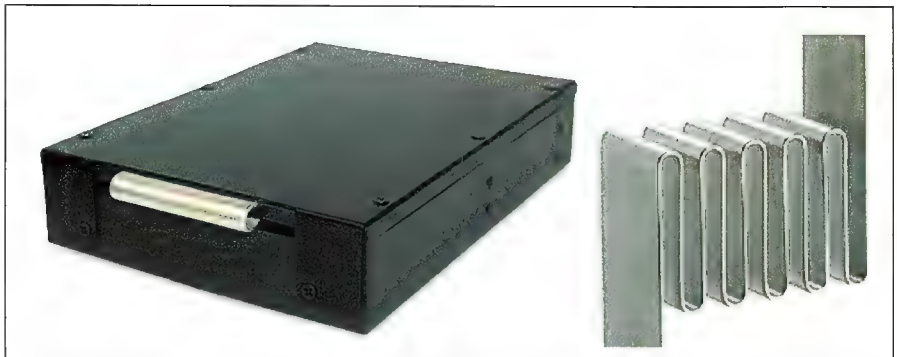
But turn this upside down, and the heatpipes will fail to operate. This has been a recent issue with the advent of motherboard chipset heatpipes and some of the newer cases, such as ones from Lian-Li with inverted motherboard trays. If you find your motherboard, GPU or CPU temps increasing rather than decreasing when inverted, there's not a lot you can do – you'll need to run them the way they were intended.

There is a solution though – 'sintered wick' heatpipes use a fine porous wick that allows condensed fluid to flow back through the use of capillary action. Such heatpipes can defy gravity. The finer the pore radius of the wick, the higher the gravity it can operate against. Not surprisingly, some vendors are already using such heatpipes on silent GPU cards to ensure they operate in any orientation.



Images courtesy of www.shuttle.com

A sintered wick heatpipe, note the porous wick structure.



Heatpipes don't have to be round, they can also be flat. Flat heatpipes have the advantage of cooling larger areas, and are ideal for PCBs or tight spaces, like Scythe's Silent Drive enclosure (above left).

flows back down to the hotter end where the process repeats.

Though simple in design, there are many factors at play. As stated gravity can be used to aid the process of vaporisation and condensation, but more often than not capillary action through a 'wick' (usually consisting of powdered metal) is used to aid the flow of the liquid back to the heat source, enabling them to work against gravity.

Additionally, the pipes are usually backfilled and sealed with gas (which can be air) at low pressure, creating a lower potential boiling point for the liquid inside. Heatpipes used in home PCs typically use water, but due to the pressure inside the pipe the water vaporises at around 30 degrees Celsius.

And are they effective? You bet! A copper/water heatpipe can be *hundreds* of times more effective than a pure copper pipe alone.

Superconductors of heat

Now here's where it gets fun. The material of the pipe and the liquid therein determines the effectiveness and application of the heatpipe. At the cold end of the spectrum a heatpipe with helium as the 'working fluid' can operate in temperatures near zero Kelvin (-273 degrees Celsius). At the upper end a molybdenum or tungsten pipe filled with lithium can work at temperatures approaching 1800 degrees Celsius. To put this into perspective, the common example put forward by Los Alamos when the first lithium heatpipe was developed is a heat transfer power density of 23 kilowatts per square centimetre. The sun, by comparison, emits some six kilowatts per square centimetre from its surface. And you thought that picture of Cameron Diaz in a bikini constituted *hot*.

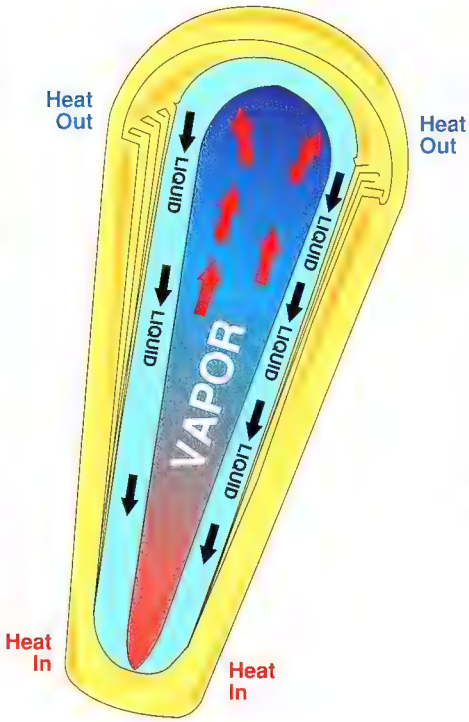
Thankfully, our CPUs don't get that hot (yet) and the heatpipes used in CPU, GPU, chipset and power supply cooling generally consist of aluminium or copper pipes filled with distilled water or a mixture of water and additives to lower the boiling point further. Other common working fluids for this temperature range include acetone and methanol.

Now you know why some of the newer heatsinks rely *solely* on heatpipes to transfer heat from the core to an elevated heatsink. There's no need for direct contact of the heatsink metal, as the heatpipes can transfer far more than the metal alone.

Working Fluids and their temperature ranges

MEDIUM	MELTING PT. (°C)	BOILING PT. AT ATM. PRESSURE (°C)	USEFUL RANGE (°C)
Helium	- 271	- 261	-271 to -269
Nitrogen	- 210	- 196	-203 to -160
Ammonia	- 78	- 33	-60 to 100
Acetone	- 95	57	0 to 120
Methanol	- 98	64	10 to 130
Flutec PP2	- 50	76	10 to 160
Ethanol	- 112	78	0 to 130
Water	0	100	30 to 200
Toluene	- 95	110	50 to 200
Mercury	- 39	361	250 to 650
Sodium	98	892	600 to 1200
Lithium	179	1340	1000 to 1800
Silver	960	2212	1800 to 2300

Source: Cheresources.com



Evaporation and condensation are the wheels of a heatpipe.

Shapes and sizes

Not all heatpipes are, well, pipes. They can actually be produced in various shapes and sizes, as long as their properties remain similar.

Depending on the design, these are sometimes known as 'mega flats' or 'heat sheets'. The former uses a collection of tiny heatpipes sandwiched together into a flat plane. The latter consists of two metal sheets with patterns of tiny indentations welded together, and a working solution introduced between them.

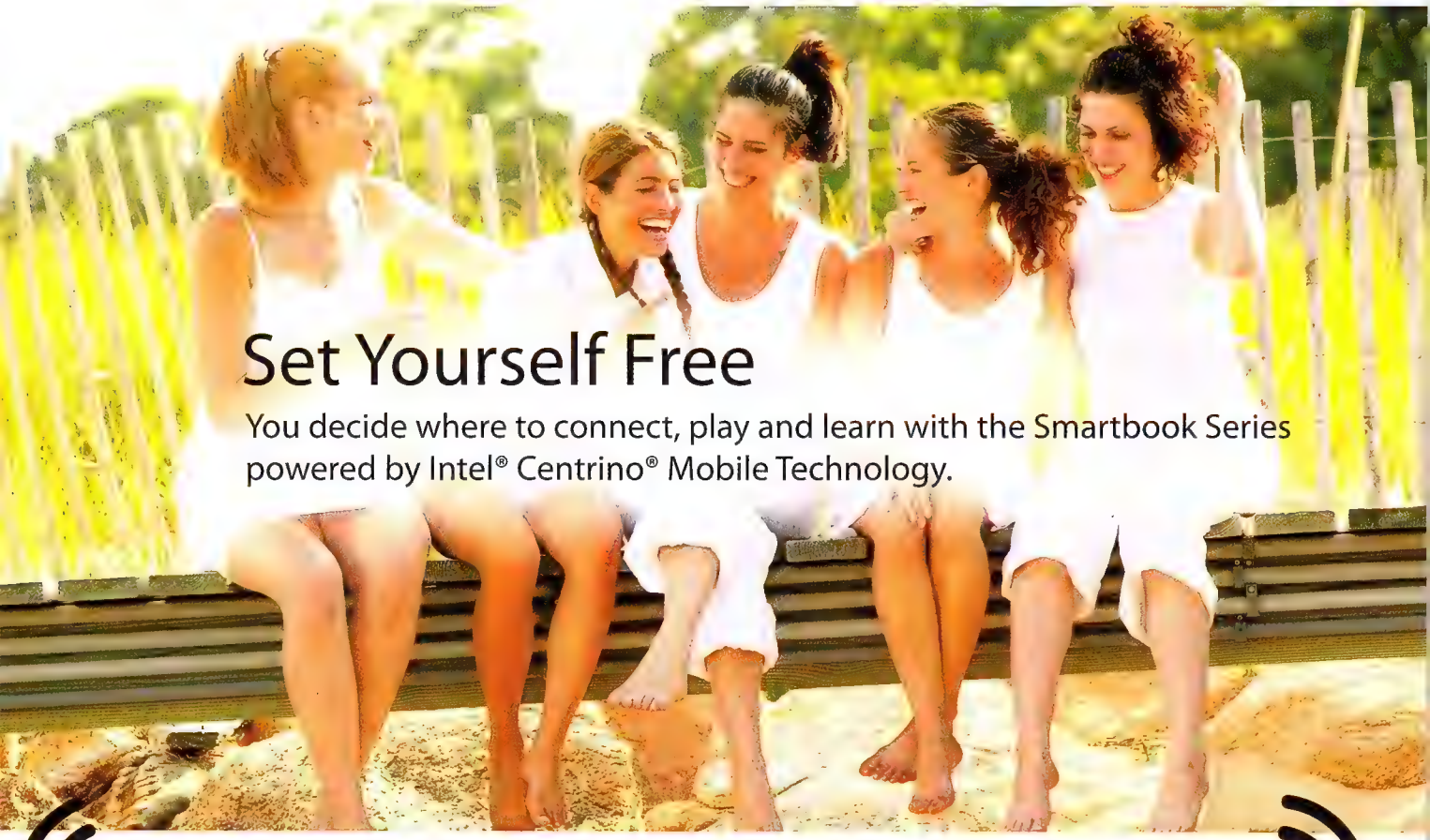
These special heatpipes are ideal for cooling surfaces such as PCBs. Recently, we've seen the use of these heatpipes in products such as hard drive enclosures from silent cooling vendors. Such enclosures cancel out sound, but still need to dissipate heat, and mega flats allow heat to be transferred from inside the enclosure to the outside where it can be dissipated. They're also starting to make an appearance in GPU cooling solutions so as to maintain an efficient cooling system in a single slot solution.

So as you can see, the beauty of heatpipes is that they are able to transfer heat from one location to another, with excellent transfer capacity and minimal loss, and do so without any moving parts. They are thus reliable, have long life spans, and totally silent. We have to say it – how cool is that?

intel inside

centrino

MOBILE TECHNOLOGY



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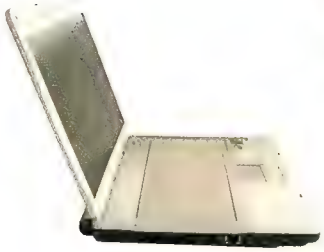

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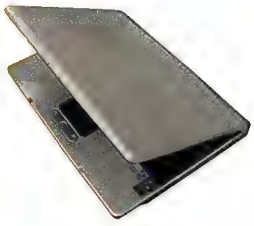

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hardcore

News, reviews and round ups on the latest hardware technology for your box

I used to want to be a programmer. The thought of writing complex programs that spat out wonderful lines of output, based merely on thoughts that came out of my noggin, seemed intensely satisfying. I even went as far as studying programming for a couple of years. The idea was that appealing. But one day, after digging through a couple of thousands of lines of code looking for an incorrectly placed bracket (yes, it was a very simple program), it hit me. Programming anything more complicated than a VCR is actually bloody hard. This is why I have all the respect in the world for programmers. It's also why I pursued a career in writing about programs rather than creating them.

But if I thought programming was difficult back then, my mind boggles at the hurdles facing programmers today. Specifically those faced by game engine programmers, with the hurdle being parallel programming, brought about by the introduction of multi-core processors.

While IBM, Intel and AMD, in increasing processor power, had no easy alternative to moving towards this kind of architecture, I bet many game programmers are rueing the day our desktop CPUs made this change.

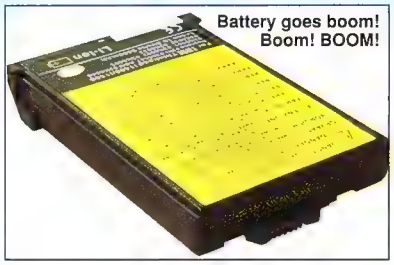
Developing programs that are multi-threaded is a very different task to the traditional singlethreaded programs. I won't pretend I understand the intricacies of multithreaded programming, but there's one obvious sign that it's much harder than Intel or AMD would have us believe – multithreaded applications are about as common as Nelson Mandela supporters on Cronulla beach. It's going to take some time before programmers become comfortable with the concepts of concurrency needed when creating multithreaded programs. Until then, the single cored processor will still be a worthy chip.

Bennet dreams to be on Dancing with the Stars.

bring@atomicmpc.com.au

this month

short circuits



Thirty five thousand laptop battery packs are on their way back to Dell after the system integrator issued a recall recently. According to reports, the batteries are prone to overheating – and the last thing anyone wants is a lap full of burning lithium slag.

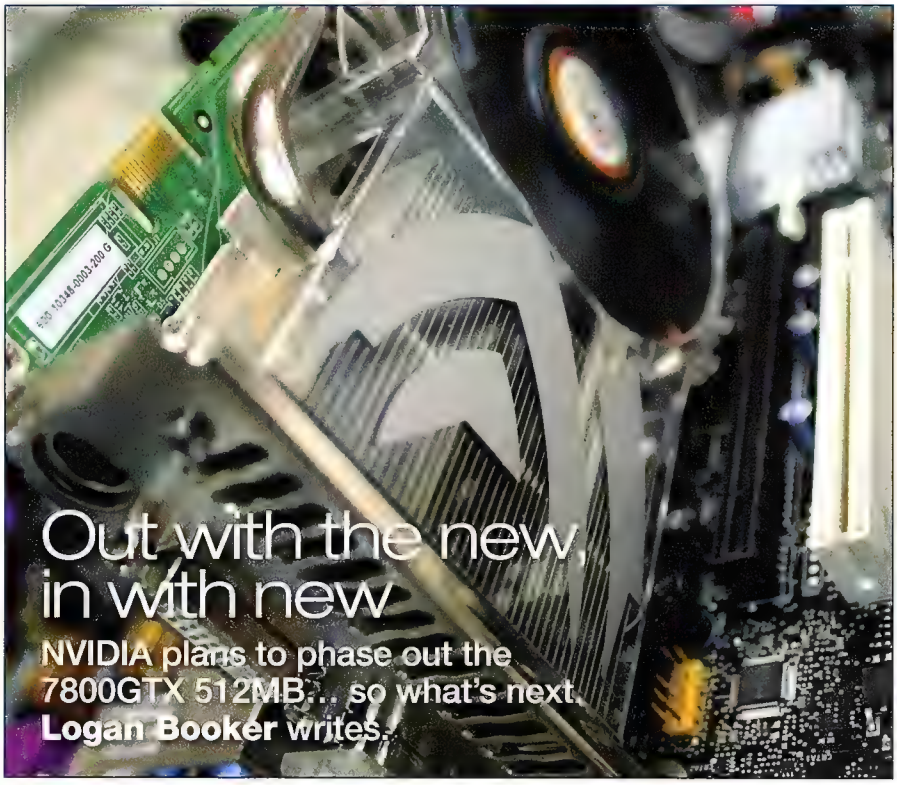
A signed contract and $71m later, and chipset maker ULi is under the umbrella of NVIDIA. The move is not so much about technology as it is about strategy. Industry watchers believe the purchase will make it harder for motherboard manufacturers to pair ATI's Xpress northbridge with a southbridge, as ULi is a major supply of compatible southbridges.

After 12 years of development, a UK inventor has designed a special road 'ramp' that generates power as a vehicle drives over it. The 'Electo-Kinetic Road Ramp' has already garnered interest from various townships in the country who see it as a way of saving on their traffic light power bill. We suppose as long as there are plenty of Skylines and Civics in the world, then this thing could seriously go off, bro.

The continuing war of high definition DVD standards recently went the way of Blu-Ray after HP stated that it would be supporting Sony's format in addition to the competing HD-DVD. Although it has a massive amount of support at the moment, Blu-Ray won't completely beat out HD-DVD while Microsoft still plans to include it in future refreshes of its next-gen console the Xbox 360. (It's not in currently available versions of the console.)

techtrends

Quenching your thirst for the latest technology and hardware happenings



Out with the new, in with new

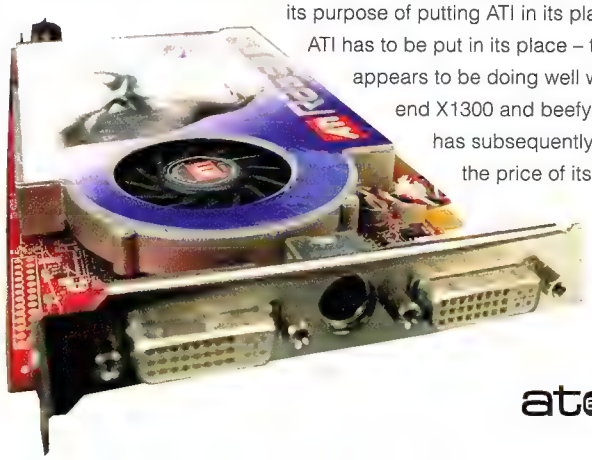
NVIDIA plans to phase out the 7800GTX 512MB... so what's next, Logan Booker writes.

According to various online sources, NVIDIA has a few tricks up its sleeve for the new year in regards to its line-up of GPUs. According to hardware news site CoolTechZone, an NVIDIA insider suggested that the 7800GTX 512MB is going to be phased out in February 2006, mere months after its release and subsequent crushing victory over the still-fresh X1800 XT from competitor ATI. The other titbit of news floating in cyberspace is that NVIDIA might have a GS version of the 7800 in the works, after engineering samples were spotted making the rounds. A cheap 7800 sounds good to us – and that's not even the best part. Reportedly these engineering samples were of the AGP variety.

What this means is that NVIDIA has recognised a gap in the video card market. While PCI Express is the way to go for future upgrades, there are still a large number of quality motherboards floating around in PCs that don't support the new bus. A high-end AGP card would cater to this audience.

In fact, it would be the only card in the market to do so. With NVIDIA's 6800 and ATI's X800 GPUs starting to show their age with the new wave of hardware, the 7800GS would not go unnoticed. Until we know more, it's just speculation, but on some level it makes sense.

Coming back to the 7800GTX 512MB, NVIDIA looks like it is preparing to unleash a series of refreshes of the G70 in the next three months, the GTX 512MB having served its purpose of putting ATI in its place. Not that ATI has to be put in its place – the company appears to be doing well with its low-end X1300 and beefy X1800 and has subsequently lowered the price of its mid-range X1600 cards to make it more appealing. It's also

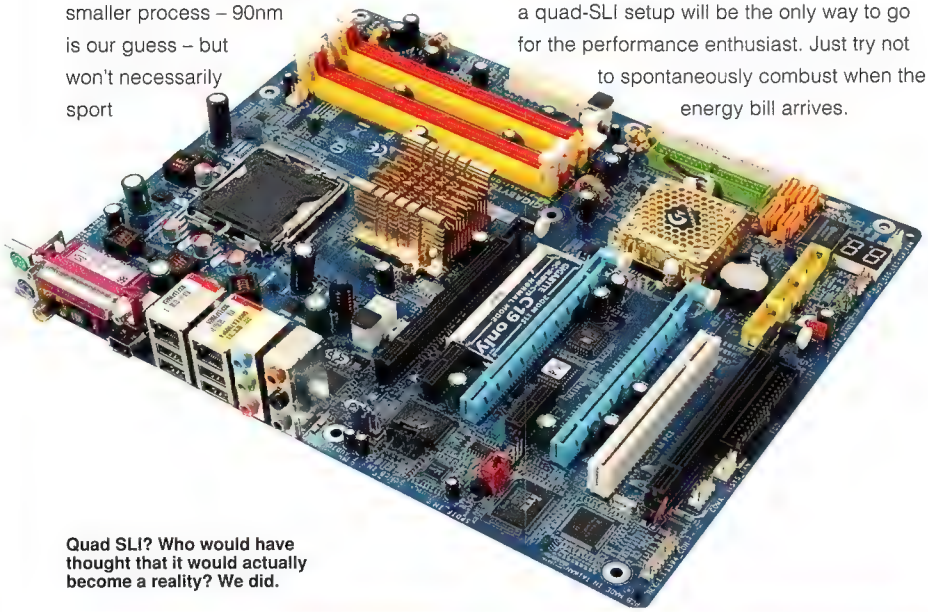


The current incarnation of the G70 has most definitely hit a speed and heat wall at 110nm...

not out of the question that ATI will refresh the R520 to stamp out any niggling problems with the new architecture.

Regardless of what ATI might be doing, NVIDIA is not content with just holding the heavyweight performance belt – it seems dedicated to securing its place in the hearts, minds and most importantly the PCs of hardcore gamers everywhere. Although there are no details on the aforementioned refreshes of the G70 they will more than likely be manufactured on a smaller process – 90nm is our guess – but won't necessarily sport radical architectural changes. The current incarnation of the G70 has most definitely hit a speed and heat wall at 110nm, but NVIDIA could still manage to squeeze some more juice if we're prepared to endure louder fans and larger heatsinks.

Also on the horizon is quad-SLI. We're predicting a driver release from NVIDIA in the next 6 months – the 90.xx ForceWares – that will make this beastly setup possible. Although excessively unnecessary, extremely loud, power-hungry and insanely expensive, a quad-SLI setup will be the only way to go for the performance enthusiast. Just try not to spontaneously combust when the energy bill arrives.



Quad SLI? Who would have thought that it would actually become a reality? We did.

hotornot

hot

Athlon 64 FX-60
Fast and furious

30in TFTs
So big your eyes bleed

AGP
Still has some life in it

Quad-SLI
Four cards equals four times the orgasming

Socket 939
Still the one

not

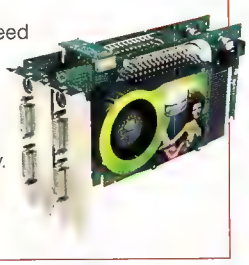
Pentium EE 955
Hot and depressing

14.1in CRT
So small your eyes bleed

PCI Express
Too much too soon

Standard SLI
Two cards? You pussy.

Socket M2
Where the heck is it?



short circuits

You can thank Andreas Pavel for cool stuff like this. Well, the music playing part anyway.

After much legal hammering, German inventor Andreas Pavel has finally been recognised as the creator of the personal stereo. Previously Sony held the prestigious title, and although the company had in part accepted that Pavel was responsible for the technology and paid various royalties, it was nowhere near the amount he should have received.

Drivers are great, so it's awesome to hear that NVIDIA has released an update for its ForceWare drivers, bringing the package version to 81.95. The most important changes are support for the GTX 512MB and 6800GS, but there's a bit of love for dual core owners and players of Quake 4 and Call of Duty 2 as well.

Seagate buying Maxtor? Has the world gone crazy? Maybe it has, but that doesn't change the fact that the #1 hard drive manufacturer has consumed one of its competitors, all for the sweet price of US$1.9 billion. The two companies will continue to trade under the Seagate name and they expect the takeover to be completed by the middle of next year.

If they use steam to generate energy at your typical coal-fired power plant then there's nothing to stop a company like BMW developing a steam system for its cars. And it has, the benefit reportedly being a 15 percent gain in efficiency. It's hybrid of course, but it's nice to hear something about hybrid vehicles that doesn't involve batteries and electricity.

groundzero

Technology from the front lines.

Dumb smart houses

Daniel Rutter wants his robot in the kitchen, where it belongs.

The 'smart house' is one of those cool old sci-fi ideas that hasn't quite managed to break through into reality.

Here we are in the 21st century, and we don't have flying cars, sentient robots, or houses that greet us by name when we come home and present us with a perfectly cooked dinner five minutes later.

We have the base technology to do all sorts of smart-house-ish things now. Actuators, sensors, processors, communications; check.

And yet, home automation is still practically unknown, if you don't count burglar alarms and, for the wankers out there, powered curtains in home cinema rooms.

Yes, there are robot vacuum cleaners, but they still need a lot of human interaction – they don't just wait for you to break a glass, then zip out of the skirting board, suck up the fragments and scoot away again.

What we have is still kid's stuff compared with the old *World Of Tomorrow* promises, though. Where, dammit, is the home automation equivalent of the flying car?

Well, the automatic dinner-preparing fridge/oven is a *major* process control problem. Industrial robots are getting better at dealing with things that aren't all precisely the same shape, moving at precisely the same speed, and lit precisely the same way, but right now you'd still pretty much have to buy a whole new auto-kitchen for each type of meal.

You can already get a combination chiller/oven that keeps an object cold until a given time and then cooks it – most modern ovens with a clock can do the second part, but it takes something like Whirlpool's 'Polara' combo to do both. But the list of Michelin-hat meals that can be prepared this way is not long.

And then there's the Internet washing machine, which can, uh, automatically call the repair guy when – like all washing machines that don't have a simple mechanical timer, and all super-expensive kitchen appliances that install in specially sized cabinets – it breaks the hell down.

These sorts of devices can, often, be *controlled* over the Internet. Leaving aside whether this is very useful for most people, I refer you to **tinyurl.com/2ywye**.

And, as is normal for new communications protocols, the Digital Living Network Alliance (DLNA) standard that's supposed to interconnect smart house products is being implemented in gloriously incompatible ways by different manufacturers.

And then, there's the thrice-damned Internet refrigerator. No sane person wants one, but LG are still putting their darn fridge-with-a-screen in their ads, as if it's an exciting example of their unbeatable innovation, and not like installing a DVD player in a bike.

Sure, maybe in the future there'll be RFID tags on all of your products (useful banana stickers?!), and the fridge will make it easy to auto-order groceries, or just tell you when stuff (including medicine) is approaching its use-by date.

Though, ideally, I'd also like to see a pusher bar that ejects ghastly furry things that once were food into a small incinerator on the side of the fridge.

The real smart house advances have come in unexpected areas. There's the recent development of surfaces, including transparent glass coatings that reject and/or break down dirt, for instance. And simple alarm system sensors that can tell if your hot water system has sprung a leak.

Some of this stuff also looks likely to save power, by opening and closing curtains and vents to minimise heating and cooling expenditure (maybe not opening the curtains while you're naked in the front room...), and stopping people from leaving lights on.

Perhaps we'll actually have decent smart houses before the advent of fully programmable matter. But I wouldn't bet my flying car on it.

What do you think Dan should automate in his house?
dan@atomicmpc.com.au

Here we are in the 21st century, and we don't have flying cars, sentient robots, or houses that greet us by name when we come home.

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F-Series mouse pads

Supplier Gamerzstuff
Website www.gamerzstuff.com.au
Price $45.00 and $49 (two sizes)

For everything there exists a pinnacle of perfection. For ice cream, it's Homer Hudson's Chocolate Rock. For hats, it's the incredible beer hat. And for mouse pads, it's the F-Series from Func Industries. These slick pads are so smooth to touch they feel like quicksilver or something equally cooly named. Func know their craft so they actually produce the F-Series in two 'grains' – the F10.s for you softies and the F30.r for the hard bastards. After using the F30.r with an MX510 we can safely say this is one of the sleekest, smoothest, fastest mousepads money can buy. It's kissable.

Aerocool Cool Panel 2

Supplier CoolPC **Website** www.coolpc.com.au **Price** $88.00

Take a look ladies and gentlemen, for this is the Borg of baybus devices. It features not only a niftyrific LCD display and control center to monitor your fans, temps, and pets but it also comes with just about every I/O interface since the dawn of the wheel. Headphone, mic, USB, Firewire, and a 20-in-1, yes that's *twenty*, card reader. We don't thnk we've even *seen* that many cards, let alone own them. But wait, it gets better – the card reader is detachable and portable, and comes with a USB cable so you can plug it in anywhere. Nice.

Lovable Dog toy cam

Supplier Anywar
Website www.anyware.com.au
Price $24.00

Ah, spy cameras – violating privacy laws the world over. Although this little baby might be illegal if used improperly, it's so damn cute you won't even care. Stick it in places as fun and original as your bathroom, sister's room, your cupboard or a B-52 bomber! It comes with everything you need to become a amateur surveillance professional, and hooks easily to any USB port on your. If you're afraid someone might find it, never fear – the disarming red shirt with the heartfelt message will make sure nobody discovers your clandestine perversions.

Memory Slot cleaning kits

Supplier Anyware **Website** www.anyware.com.au **Price** $3.90

Now while there's a well known perception that geeks are unlikely to notice weeks of caked sweat, coke, and pizza cheese on their bodies, the humble PC is far more discerning. Be assured, dust and gunk will make its plans to inflitrate your beloved box at every opportunity, and then do what dust and gunk does. Memory slots are no different, and hard to clean in tight spaces. Say hello to your new friends, a match made for memory.

ASUS RX3141 Gigabit Switch

Supplier ASUS
Website www.asus.com **Price** $299.00

For those who have a broadband modem without a router and feel the need for extra control and protection, this four port gigabit switch/router from Asus is the ticket. With an SPI firewall, protection against Denial of Service attacks, packet filtering, ACL, NAT, DHCP, WAN port and a bunch of other acronyms usually associated with these things, the RX3141 should satisfy pretty much every geek's need for small network management. Ooh, and it's *black*.

AC Ryan lighted LAN cable

Supplier PC Case Gear **Website** www.pccasegear.com.au
Price $15.00

Everyone knows that blingy lights make things go faster. Same application of physics as red cars and tower PCs. So where else do you need this ethereal benefit of speed? With your network cables, of course. These AC Ryan lighted cables come with an extra USB pass-through that provides blue LED lovin' at both ends of the cable. This greatly helps the bugs living behind your PC find their way around in the dark. A foil lining makes the cable stand out even during the day, not to mention minimise RF interference. For LAN gaming these bright sturdy cables are a must, and are serving us here quite well now.

Shuttle External Drive Enclosure

Supplier Shuttle **Website** www.altech.com.au **Price** $189

Even cute SFF PCs need external drives now and then, and Shuttle has come to the rescue with a neat box made for its range of teeny tiny PCs. Don't be fooled by its simplisitc rectangular boxish apperance, its innards are actually highly changeable, Transformers style. The face plate and side heatsink fins can be removed to enable the conversion from hard drive caddy to optical drive support, how cool is that? The only downside to this nifty box is it's all PATA, so if you use it as extra disk storage you'll need to use an *older* drive. A compact product for compact PCs.

BILL'S REVIEW!

Logitech G15 Gamer's Keyboard

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"Now this is more like it. GeILs PC2-5300 Ultra is the highest rating DDR2 in this roundup, and it shows. ...climb past the 711MHz limit the other modules couldn't break, but eventually levelled out at 727MHz using 4-4-4-10."
Atomic MPC Dec 2005

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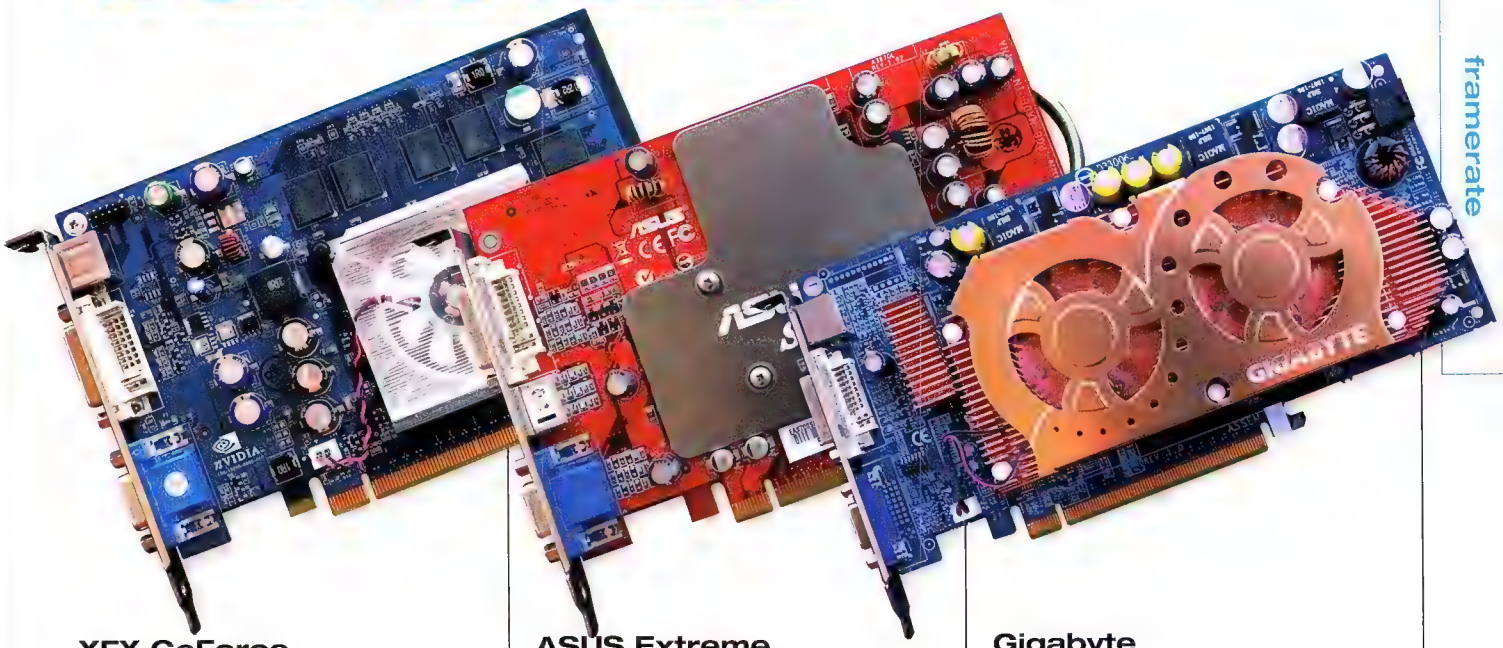


XFX GeForce 6600 DDR2

GPU: **NVIDIA GeForce 6600 DDR-2**
Memory size: **256MB**
Core clock: **400MHz**
Effective memory clock: **800MHz**
Memory type: **128-bit DDR2**
Pixel pipelines: **8**
Vertex shaders: **3**
Video out: **DVI; D-Sub; S-Video**
Price: **$249**
Supplier: **Multimedia Technology**
Website: **www.mmt.com.au**

The two variations of memory used in graphics cards have been DDR1 and GDDR3. DDR2 made a quick appearance with NVIDIA's FX 5800 and ATI's RADEON 9800 Pro 256MB series, but it wasn't yet mature enough. The GeForce 6600 DDR-2 marks the beginning of DDR2's return to the graphics segment. This edition of the 6600 is faster due to the higher-clocked core and memory. NVIDIA specifies a 350MHz core, however XFX has squeezed out another 50MHz. A decent and affordable budget gaming card, it notably sports a full copy of FarCry. Impressive.

ASUS Extreme AX700 Silencer

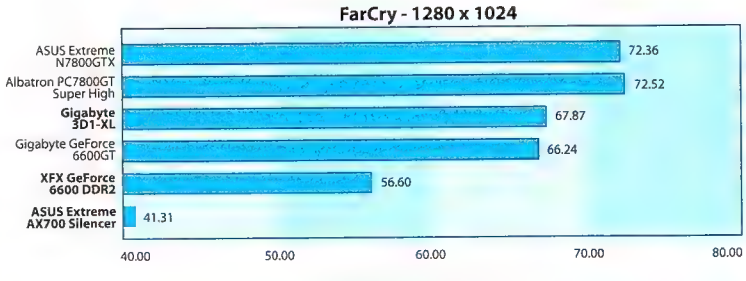
GPU: **ATI RADEON X700LE**
Memory size: **256MB**
Core clock: **400MHz**
Effective memory clock: **500MHz**
Memory type: **256-bit GDDR3**
Pixel pipelines: **8**
Vertex shaders: **6**
Video out: **DVI; D-Sub; composite**
Price: **$199**
Supplier: **ASUS**
Website: **www.asus.com.au**

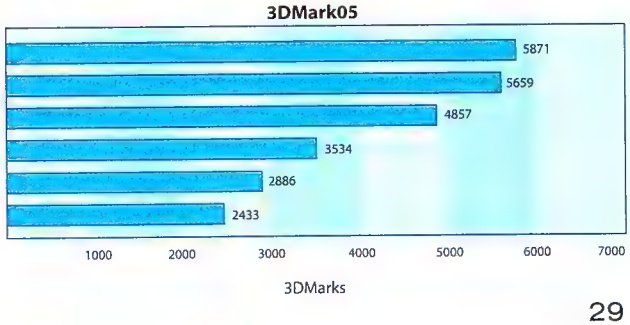
With all the issues related with a successful implementation of passive cooling, ASUS has propped up with its respectful 'Silencer' range. Featuring no fans, they take advantage of the ventilation the CPU cooler offers. Like other editions we've seen, the AX700 features a two-in-one heatsink, with a small segment that swivels on a hinge. The significant difference with this card is where the GPU is located – it's on the back of the card. This offers better cooling, as the heated side is now directly cooled by the CPU fan. This is a cool-running card built for quiet budget gaming.

Gigabyte 3D1-XL

GPU: **Dual NVIDIA GeForce 6600**
Memory size: **256MB (128MB each GPU)**
Core clock: **450MHz**
Effective memory clock: **1000MHz**
Memory type: **128-bit GDDR3**
Pixel pipelines: **8**
Vertex shaders: **3**
Video out: **DVI; D-Sub; S-video; component**
Price: **$348**
Supplier: **Gigabyte**
Website: **www.giga-byte.com.au**

Far cooler and quieter than its slightly older brother, the 3D1 (which sports two 6600GT GPUs), this dual setup is made up with the slightly slower 6600 GPU. This is the perfect card for those that specifically want to play with an SLI setup, but don't want the bulk of such an – albeit awesome – setup. Thanks in no small part to the Samsung memory modules onboard, the memory is clocked much higher than usual and is one reason this tasty slice of PCB performs reasonably well. As long as the mobo supports it, this is SLI for the masses.





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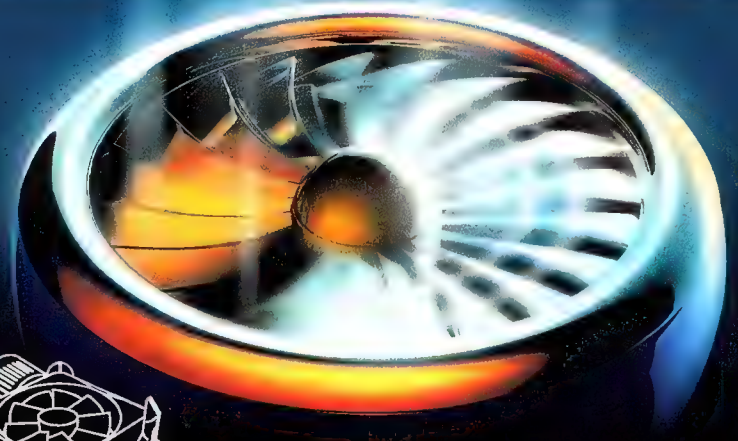

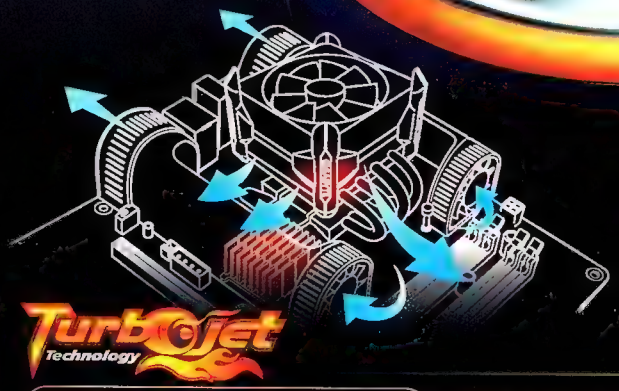

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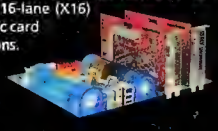

Creative Sound Blaster

Creative Sound Blaster Live 24-bit with DTS support delivers heart pounding 7.1 channel surround effects.

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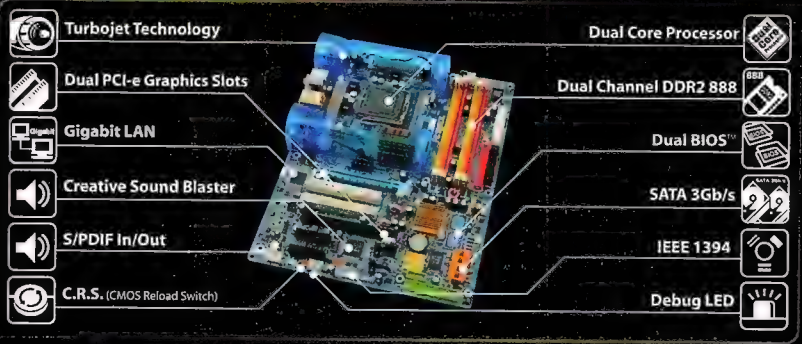
C.R.S. provides convenient default settings retrieval and jumper-free CMOS reload.



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headtohead

Bite-sized comparative round-ups of the hottest gear

How to XL

Logan Booker and **Nick Ross** round up the latest batch of X1800 XLs.

Graphics cards are great in that you can tell more from reading the name on the box than you can from looking at the hardware. Usually, a flashy heatsink and coloured PCB say nothing of the performance capabilities of a card. Red does not necessarily mean faster and green won't make it that much more environmentally friendly.

Take the RADEON X1000 series, for instance. The X1300, with a smaller numerical value in its name compared to the X1800, tells you that the latter is better than the former. The thing is, the X1800 currently comes in two flavours – the XL and the XT. Both have greater performance than the X1300, and the mid-range X1600, but the XL isn't quite as hot as the XT. Not that you would know this by the name.

So, what's the difference? About $300, 256MB of GDDR3 and 625MHz' worth core and memory clock speed increases. Obviously, the X1800 XT definitely has a lot going for it. The only problem is that it's hard at this point to get your hands on an XT without poisoning the tea of every other hardware hungry tech head in the vicinity of your local computer shop.

With demand high and supply low, we turn to the XL, which, although not as well-specced as the XT, puts up quite a fight. It still has the same high-performance 256-bit (512-bit effective) Ring Bus memory architecture, shader and vertex processor counts and the other miscellaneous performance tweaks unique to the X1800. It competes modestly with competitor cards – in this case the 7800GT and GTX – and has plenty of headroom for clock tweaks, driver updates and loads more GDDR.

So it made sense to gather a posse and hunt down five of these little beasties, put them head to head, and tell you which one you should get. That, and there's something sensual about fondling a pack of cutting-edge cards.

512 little problems

At the moment, ATI has yet to secure the performance crown, having snagged it briefly with the release of the R520, but being cruelly snatched away weeks later by NVIDIA's the 7800GTX 512MB. Despite what you might think, this performance did not come via the extra 256MB packed onto the 7800GTX – after all, there's a 512MB version of the X1800 and it can't catch NVIDIA's king card. No, the extra speed is thanks to some clock vamping, which surprised many as the 7800GTX is manufactured at a larger process – 110nm versus 90nm. Somehow, NVIDIA managed to squeeze over 100MHz from the core and around 250MHz from the memory. This caught ATI off-guard, and now it's back playing catch up again.

This doesn't mean that the X1800s aren't a good buy. As previously mentioned, there's plenty of headroom in the architecture and no doubt it will find its legs in the next 3-6 months. This will come in the form of core tweaking – much like NVIDIA's 512MB GTX – or steady driver updates.

For now, the 7800GT (and NVIDIA) wins out in Direct3D, soundly destroys the 1800 XL in OpenGL and is on average $50 cheaper. Still, if your heart is set on ATI, then this Head to Head is for you.

HOW WE TESTED

To put these cards through their paces, we rigged up an AMD Athlon 64 4000+, ASUS A8N-SLI Dexluxe motherboard, 1GB Crucial PC3200 RAM and a 36GB WD Raptor hard drive. We ran Half-Life 2 and Far Cry to test general graphics (Direct3D) performance, and Doom 3 to test OpenGL performance. All tests were conducted with 4x anti-aliasing and 8x anisotropic filtering. Two high resolutions were used for the benchmarks – 1280x1024 and 1600x1200 – to eliminate as much as possible the CPU from the equation. This gave us a reliable set of comparative benchmark results.

PowerColor X1800 XL

Price **$605** Supplier **www.pc.net.au**
Specifications **500MHz ATI R520 core; 500MHz GDDR3 memory (1GHz effective); 8 vertex shaders; 16 pixel shaders; 2x DVI outputs. 1-year RTB warranty. Pacific Fighter included.**

Though we haven't heard much out of PowerColor recently, they won Best Graphics Card Manufacturer at the recent Atomic Live 2005 awards, as voted for by you! It's not surprising either, for while they don't flood the market with products those that they do release are often of a high calibre.

Like the MSI RX1800 XL, the PowerColor comes with just the one game in the box – Pacific Fighter. However, it's $60 cheaper than the MSI and almost $100 less than the expensive Gigabyte and ASUS. It couldn't overtake the 7800GT, but it's the one of the best X1800 XL cards availble. When you take into account that apart from the software bundles, all five cards have identical hardware, the PowerColor is the most attractive purchase.

ASUS EAX1800 XL

Price **$699** Supplier **www.pc.net.au** Specifications **500MHz ATI R520 core; 500MHz GDDR3 memory (1GHz effective); 8 vertex shaders; 16 pixel shaders; 2x DVI outputs. 1-year RTB warranty. Chaos League, Second Sight, Powerdrome, Project: Snowblind, Joint Operations and Xpand Rally included.**

Of the cards tested in this roundup, the ASUS EAX1800 XL performed the best, pushing ahead in Half-Life 2 and Far Cry and Doom 3 benchmarks. Naturally, this is a little surprising considering the identical configuration of the cards. Indeed, apart from a different brand on the heatsink, the ASUS card is physically identical to the rest of the cards in this roundup.

It does however separate itself from the pack with its impressive list of bundled games, which include Project: Snowblind and Second Sight. Unfortunately, the ASUS was also the most expensive card in this roundup along with the Gigabyte. Considering there a frame per second between the cards, there's no reason to pay extra if all you're after is X1800 XL hardware.

Gigabyte X1800 XL GV-RX18L256V-B

Price **$699** Supplier **www.pc.net.au** Specifications **500MHz ATI R520 core; 500MHz GDDR3 memory (1GHz effective); 8 vertex shaders; 16 pixel shaders; 2x DVI outputs. 1-year RTB warranty. Counter-Strike: Condition Zero and Xpand Rally included.**

Square in the middle of the benchmarks, the Gigabyte didn't quite live up to its price tag, offering only two games in the box along with the usual assortment of DVD software players and miscellaneous utilities.

As you can imagine, by the time we got onto testing this card were hoping that something, anything, that might set the different cards apart. 'Maybe the *sticker* will make it go faster?'

With Gigabyte's excellent reputation for solid and reliable products we can only assume the same extensive testing and production went into the manufacture of this entry into the X1800 XL market. However, sharing the trophy of most expensive card in this roundup with ASUS, it's hard not to choose a cheaper alternative.

MSI RX1800 XL

Price $669 Supplier **www.pc.net.au** Specifications **500MHz ATI R520 core; 500MHz GDDR3 memory (1GHz effective); 8 vertex shaders; 16 pixel shaders; 2x DVI outputs. 1-year RTB warranty. Colin McRae 2005 and limited version of Norton Internet Security 2005 included.**

While it's only by less than a frame per second, so you'd have to be Son of Terminator to notice, the MSI found itself at the bottom of the benchmarks for all three game tests, and, ignoring the usual suspects, comes with just two pieces of software – Norton Internet Security 2005 and Colin McRae 2005.

If it wasn't a limited version of Norton Internet Security and there was more software meat, then this card might just be a tad more tempting.

But, as the third most expensive card there's nothing to really justify shelling out $669 for this puppy, unless Norton and Colin tickle your fancy. Like the rest, it's little more than a sticker change on the stock X1800 XL hardware.

Sapphire X1800 XL

Price $659 Supplier **www.pc.net.au** Specifications **500MHz ATI R520 core; 500MHz GDDR3 memory (1GHz effective); 8 vertex shaders; 16 pixel shaders; 2x DVI outputs. 1-year RTB warranty. A choice of Brothers in Arms: Road to Hill 60, Prince of Persia: Warrior Within; Richard Burns Rally and Tony Hawk's Underground 2.**

Sapphire's offering was the second cheapest card of the five and instead of bundling a bunch of budget games you might never play it offers the choice of one quality game from a selection of four. It's an interesting touch.

Otherwise, this card is basically a Sapphire-branded ATI reference board with the stock heatsink and DVD software, so unless you're a Sapphire fan, there's no reason to get this over the PowerColor. If the choice of game is of interest to you, then feel free to pick this one up.

Again, with performance between the cards so close, it all comes down to bundle and price.

Conclusion

As you can see from the raw benchmark results to the right, there wasn't much between the five cards, except for the 7800GT we used as a yardstick, which handly bets the XL on two out of three occasions. The XLs were stronger in Far Cry but lost out in Half-Life 2 and weren't even in the same ballpark for Doom 3.

ATI has a lot of work to do before its latest cards can do battle with NVIDIA's offerings. Unless it can pull a rabbit out of its hat, it'll be a few months before we see anything worthy of putting up against a 7800GT, let alone the 7800GTX 512MB. ATI has done it before with the 9700, so we're expecting big things in the near future.

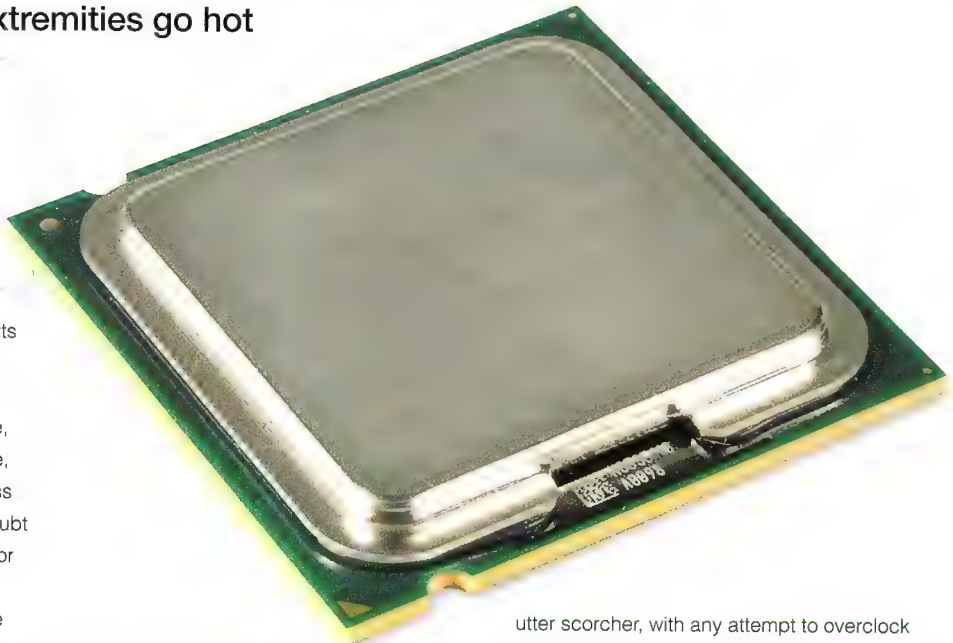
For now, if you really want an XL, grab PowerColor's X1800XL.

Half-Life 2	1280 x 1024	1600 x 1200
Albatron 7800GT	63	79.3
Asus EAX1800XL	61.2	74.1
PowerColor X1800XL	61.3	73.8
Gigabyte X1800XL (GV-RX18L256V-B)	61	73.5
MSI RX1800XL	61	73.4
Sapphire X1800XL	62	73.1
Far Cry	**1280 x 1024**	**1600 x 1200**
Asus EAX1800XL	53.6	63
Albatron 7800GT	48.1	62.5
Sapphire X1800XL	54	62.3
Gigabyte X1800XL (GV-RX18L256V-B)	53.5	62.1
PowerColor X1800XL	53.7	62
MSI RX1800XL	53.6	62
Doom 3	**1280 x 1024**	**1600 x 1200**
Albatron 7800GT	44.7	59.6
PowerColor X1800XL	33.9	46.5
Asus EAX1800XL	40	46.4
Gigabyte X1800XL (GV-RX18L256V-B)	33.8	46.4
Sapphire X1800XL	33.9	46.3
MSI RX1800XL	33.7	46.2

Intel Pentium Extreme Edition 955

Craig Simms feels his extremities go hot

Price $TBA
Supplier Intel
Website www.intel.com
Specifications
LGA775; 3.46GHz; 1066MHz FSB; dual core; 2MB L2 cache per core; 65nm process; Hyper Threading; Virtualisation Technology; EM64T extensions



So here we are again. The new year starts and both chip giants are getting ready to swing their clubs at each other with their new high end parts. The 955EE is Intel's ante, bringing a whopping 2MB L2 cache per core, Virtualization Technology and a 65nm process to the table – in exchange for what will no doubt be a small fortune, requiring selling of limbs or trading of sisters.

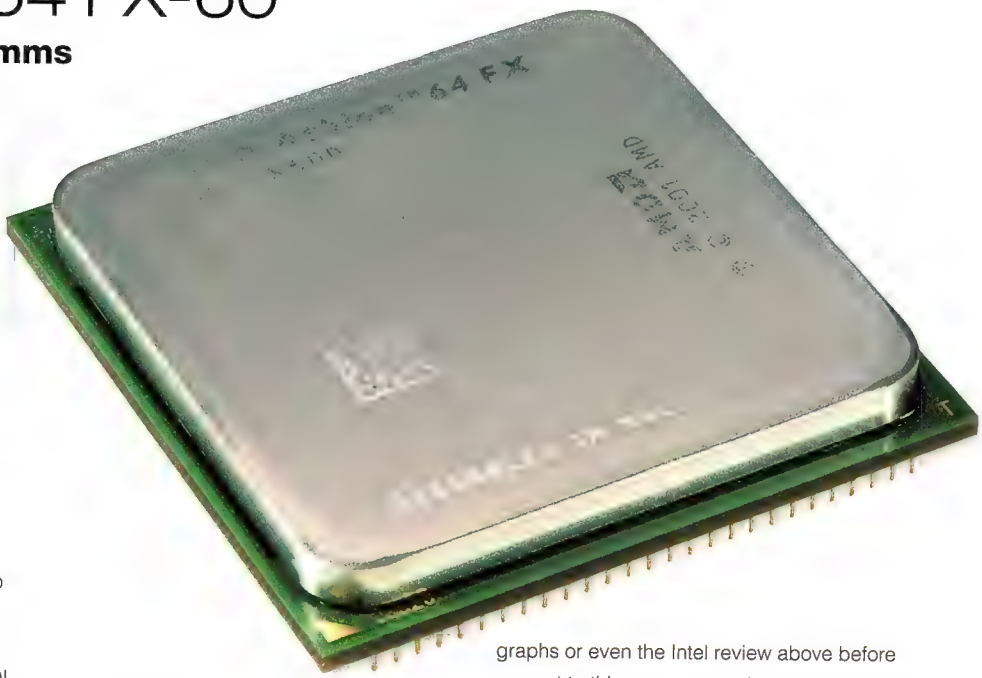
Requiring the new 975X chipset to run, the 955EE belongs to the Presler family, successor to Smithfield, of which we can expect see chips from the same cadre heading for the desktop space, albeit at 800MHz and with no Hyperthreading – which hopefully will run on older boards. No word on what's happening with third party boards though, whether support will be handled through firmware updates or new products remains to be seen.

Despite the die shrink the CPU is still an utter scorcher, with any attempt to overclock resulting in the CPU throttling the speed down automatically when using the standard Intel heatsink. We did manage to get it booting into Windows unstable at 3.7GHz – so those with better cooling may have more success.

AMD Athlon 64 FX-60

FX me, exclaims **Craig Simms**

Price $TBA
Supplier AMD
Website www.amd.com
Specifications
Socket 939; 2.6GHz; 64-bit dual core; 1000MHz HTT; 1MB L2 cache per core; 90nm process; Cool'n'Quiet Technology



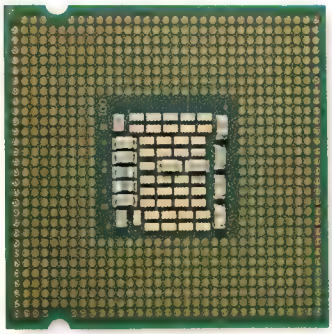
In the dimly lit, smoke filled world of the CPU world, AMD has grinned and thrown its chips on the table, knowing that it's holding all the aces. Much like most of the new dual core releases, the FX-60 runs slower than its single core equivalent, the FX-57 – however many would argue that the second core more than makes up for this, especially if you're into video editing or encoding.

We dropped this feisty platter of pinned joy into an Asus AN32-SLI Deluxe with a pair of PQI PC3200 1GB memory sticks, and were greeted with a rude message to the tone of the board not knowing what the hell we just stuck in it. Despite this the chip worked anyway, however we decided to do the right thing and a quick BIOS update later eveything was happy.

We then subjected it to the same real world and synthetic tests as the Intel, to see if the little engine could.

And could it did (I'm sure some English teacher somewhere is having a conniption over that sentence). Most likely you've read the graphs or even the Intel review above before you got to this one, so you already know the low down – AMD walks away the victor once more, speed trophy in hand.

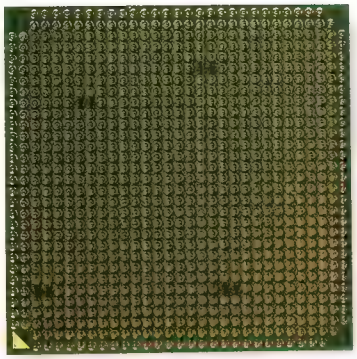
In terms of overclocking there's some decent headroom in the FX-60, as we got it to 2.74GHz stable with a standard heatsink – however we could also get it to 3GHz unstable with little



We tested using the supplied 975XBX board and a pair of 1GB Geil DDR2 PC2-5300 sticks, throwing it up against both real world and synthetic tests. For real world uses, we encoded a 1 minute raw AVI to XviD at 1400kbps, compressed a 2:42 WAV file to MP3 using LAME at 224kbps CBR, and ran Far Cry at 800x600 with everything off so the video card would not impact markedly on the scores. For synthetic, we used SiSoft Sandra (**www.sisoftware.co.uk**), SuperPi Mod (**www.xtremesystems.com/pi**) to four million digits, and the punishing RealStormBench 2004 (**www.realstorm.com**) at 320x240, which forces the CPU to render a real time 3D scene all by its lonesome using radiosity, volume lights, AA, reflections and shadows. Ouch.

As you can see from the results to the right, the 955EE lags a decent amount behind the FX-60 in everything except the Sandra Multimedia and Whetstone tests – most notably in the SuperPi Mod and 7-zip compression tests – leaving the enthusiast market squarley in AMD's hands once more.

The Presler core seems to mark the beginning of Intel wanting to play catch up, and by the time we see Conroe at the year's end, Intel fans may be able to hold their heads high once again for the first time in a long while.

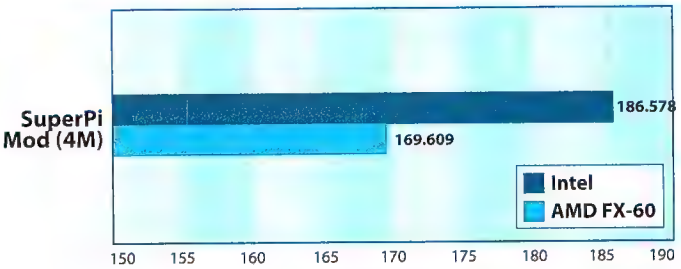


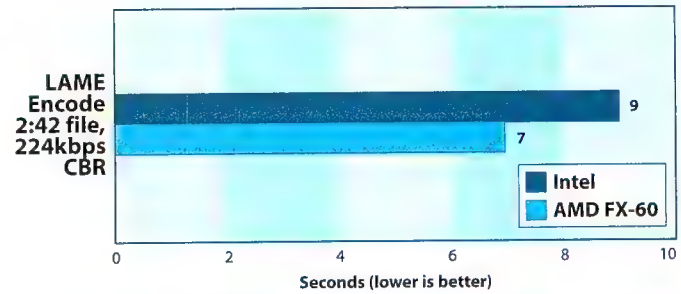
worry into Windows (oh, how Stress Prime 2004 hated us), so once again, better cooling will most likely yield better bang for buck.

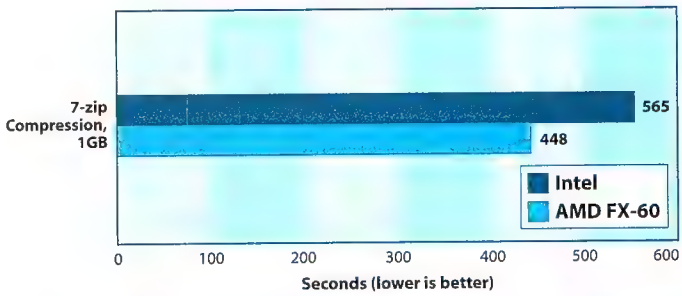
So the burning question – is the FX-60 worth it over the FX-57? The usual arguments apply for dual core processors – right now for gaming, single core rules the roost purely due to higher clock speeds, and this is reflected in our Extreme kitlog. However if you balance your geeking life with things other than constant playing of F.E.A.R., dual core is the way to go. Perhaps more pertinent is the question: what does the FX series offer over the X2s apart from the unlocked multiplier? It puzzles us as to why this brand segmentation still exists, short of holding overclockers to ransom. Unlocked multipliers for all, we say!

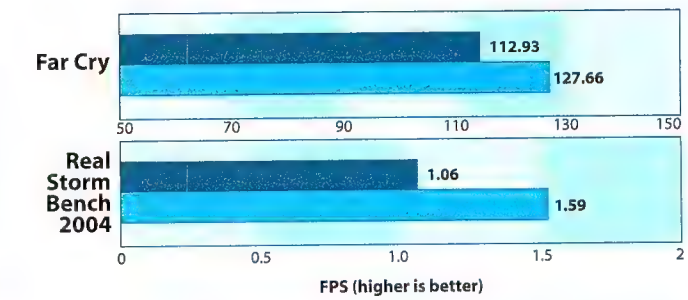
We got this chip, like 955 EE, hot off the presses as it were and neither Intel or AMD could provide us with pricing at this time. However the price point is rumoured to come in at the same level as the FX-57.

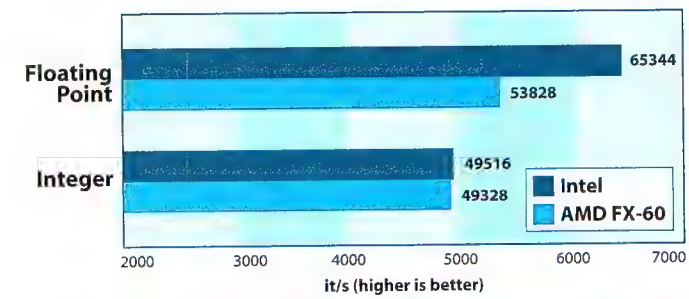
As the 939 platform prepares for retirement from the performance world into the fields of Sempron, the FX-60 is a fitting high for for the socket to end on, before the second half of the year brings us DDR2 and virtualisation in the form of socket M2. Then, as now, we should end up seeing more exciting CPU showdowns from the two giants.

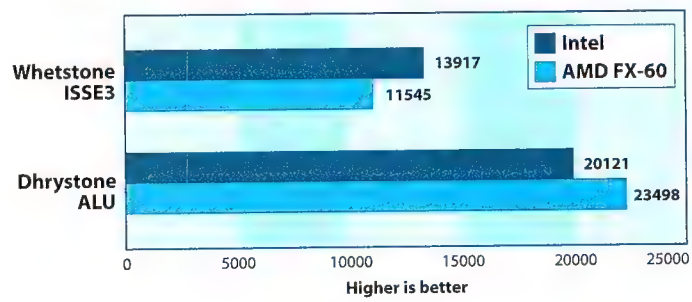












CoolerMaster CMStacker 830

Craig Simms finds bliss in a case.

spec

$340
Coolermaster
www.coolermaster.com.tw
W250 x H536 x D638; Nine 5.25" drive bays, removable motherboard tray, dust filters, top mounted USB and firewire ports.

Okay, excuse us while we wank lyrical here. The CoolerMaster CMStacker 830 is perhaps the single best case we've ever used. Star Trek styled construction and all.

Learning from the previous stacker's few mistakes, this baby's internals are now entirely aluminium in construction – well, except for the removable 3.5" drive tray, which for some reason is still constructed from the banished steel of yore, and can carry only four drives compared to Lian-Li's six. This is, however, nicely offset by being able to mount it anywhere within the 5.25" bays at the front.

The number of external 5.25" drive bays has been reduced from eleven down to nine, to create a more streamlined case. This reduction is offset by one of the most wonderful bay faceplate removal systems we've seen – two aluminium securing brackets on either side of the rack are flipped out, then the finely mesh filtered faceplates are removed by pushing in the plastic clasps on either side. Genius.

The door is a new addition, but if you don't like it, it can be easily removed. Also easily removed is the motherboard tray, complete with handle, clip lock and the smoothest action this side of Bill's butt. Or so he tells us, anyway.

In terms of cooling, 120mm fans are placed at the back and front, and there is a slot for a third at the top. A transparent, removable plastic door inside the case also serves as a framework to mount four more 120mm fans to cool pretty much all of your components, and if you're utterly cooling nuts you can mount two more in front of the remaining drive bays. You can also add Coolermaster's 'cross flow' fan to the transparent bracket if you're that way inclined, available as a separate product and designed to spread air out over the motherboard.

An entire BTX 'upgrade' kit is included if required, and above the front panel are two USB ports, a firewire port, and the requisite microphone and headphone jacks. Two more USB ports crown the case, situated next to the reset and power button, the latter featuring a stylised CM logo. Bucking the recent design trend, the PSU still sits at the top of the case.

Noise could be a concern to silent PC enthusiasts, as there is a lot of mesh on the outside and nothing to stop the whine of fans from passing through – however this should also excite cooling enthusiasts and those that choose to master the arcane art of bling.

Once again screwless access is championed, with quick release drive bays, and push button locks used to fasten the sides of the case.

About the only downsides we can find are the side panels can be a bit of a bugger to get back on, and the PCI slot covers are still held in by thumbscrews rather than a clasp release system. But this is minor whining in the face of so many positives. On top of the well designed, easy to play with interior the exterior is aesthetically sweet. Nothing short of a top polished product.

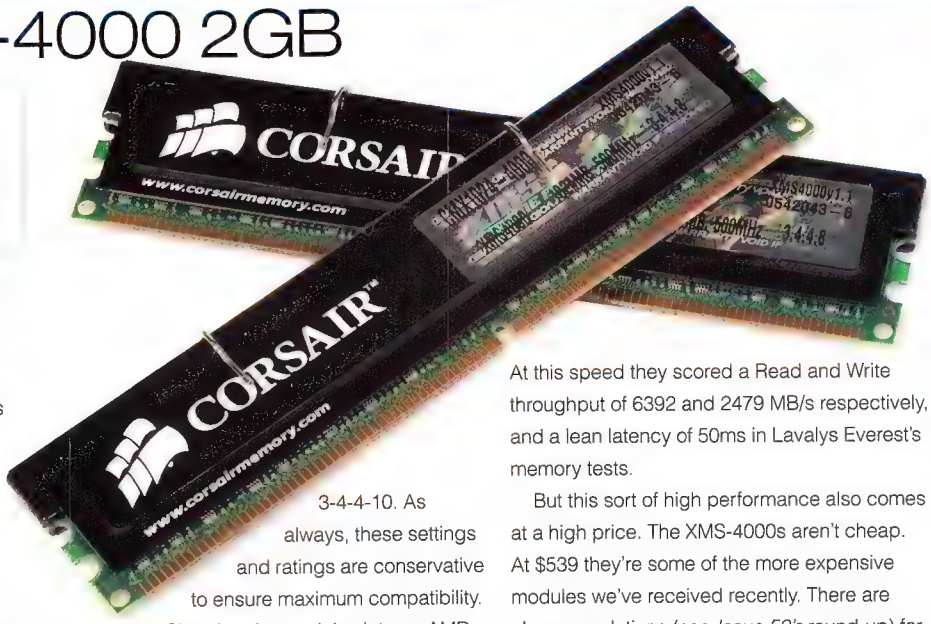
Judging by the last stacker, which we loved so much we set it on fire for the cover of *issue 54*, we'd have to melt this one into a soggy mess to do it justice. Three thumbs up.

score **9.0** OUT OF 10

Corsair XMS-4000 2GB

specs

Price **$539**
Supplier **Altech**
Website **www.altech.com.au**
Specifications **2 x 1GB paired modules, 500MHz rating, 3-4-4-8 timings, aluminium heatspreader**



Corsair has been in the memory business for a long time now, and has built itself a reputable name. The company won the 'Best Memory Manufacturer' award at the Atomic Reader Awards 2005 (a report you'll find in this very issue!). It must be doing something right for you guys to vote them your favourite.

So when this pair of 1GB matched memory modules landed on our desks we had high hopes for them. As we covered in the comprehensive memory round-up in *Issue 59*, 1GB modules are more taxing on your system's memory controller and as a result often need to run at more lax timings to remain stable.

Corsair's new XMS-4000 2GB matched memory pair is no different, and comes stock rated at 3-4-4-8 for 500MHz.

Naturally, we don't take this as a given and quickly went looking for what the onboard SPD thinks they can handle – a slightly more sedate 3-4-4-10. As always, these settings and ratings are conservative to ensure maximum compatibility.

Slapping the modules into an AMD Athlon 64 X2 4400+ testbench, we fired them up to their rated speeds. Without needing to up the juice, we leaned on the timing to see how fast we could get the modules to run.

They topped out on our test system at 2.5-3-3-8, which isn't too shabby. In our memory roundup in *Issue 59*, few modules could handle CAS 2.5 at 500MHz, so this is commendable. At this speed they scored a Read and Write throughput of 6392 and 2479 MB/s respectively, and a lean latency of 50ms in Lavalys Everest's memory tests.

But this sort of high performance also comes at a high price. The XMS-4000s aren't cheap. At $539 they're some of the more expensive modules we've received recently. There are cheaper solutions (see *Issue 59's* round-up) for similar performance. Still, in the march towards 2GB upgrades, they do the job nicely.

AM

score 8.0 OUT OF 10

Thermaltake Power Station

specs

Price **$239**
Supplier **Thermaltake**
Website **www.thermaltake.com.au**
Specifications **520W, 3.3V - 30A, 5V - 30A, 2 x 12V - 15A, dual PCI-E connectors, separate power junctions, 120mm quiet fan**

Thermaltake's Power Station 520W is, to coin a phrase, a new take on the humble PSU. All the essential stats are there – 520W total output power, 30A on both the 3.3V and 5V rails, two juicy 15A 12V rails, and a plethora of connectors including the essential dual PCI-E connectors for SLI loving.

So what sets it apart? Probably something that should have been a done a long time ago. Aside from the PSU itself, the Power Station comes with two external power junctions to help distribute power around your machine and do so without excessive cable mess. The first junction is actually a 5¼ bay device that accepts one of the eight-pin modular power cables and distributes this to six molex, four SATA, and two floppy connectors, in addition to adding a bit of blue-light bling at the connectors. On the front of the bay, a sleek brushed facia displays the 'Power Station' logo and three coloured LEDs, one each for the 3.3V, 5V, and 12V rails to show which are in use by the bay.

This device is actually pretty cool, because naturally it has all the connectors to power your drives, fans and other bay bus devices, all from the 5¼ bay area. So you don't need to have a myriad of cables stretched about the machine – just the one to reach the bay itself.

The second junction is a small portable box that takes a four-pin molex and distributes this to four more molex connectors and two floppy power connectors. The inclination here is to place (or even stick) this at the bottom of your case, near fans or other devices such as cathodes, to power these. Aout the only feature missing it seems is auto-switching – double check you've got it set to 230v before turning it on, or you'll get a free fireworks show. Overall, at this price, the power station provides plenty of power, comes with all the connectors, and offers an alternative take on cable management that's sure to get attention. A good one for the bling crowd.

AM

score 8.5 OUT OF 10

NaturalPoint TrackIR 3:Pro

specs

Price **$208.95 for TrackIR 3:Pro, $64 for Vector expansion kit**
Supplier **Mittoni Pty Ltd**
Website **www.mittoni.com.au**
Specifications **120fps refresh rate (50% faster than TrackIR 3); USB connection.**

If you play sims, you owe it to yourself to purchase the TrackIR 3:Pro. It's that easy. Rarely has there been a device that revolutionises the way you'll play your games like this terrific little motion tracking device.

It's basically a small IR camera that sits atop your monitor. You wear a special Track IR hat that's basically a baseball cap with a few reflective patches on it. The camera then transmits small head movements into the virtual head movement within the game. Got a bandit bouncing on your six o'clock that needs to be padlocked? Forget fooling around with a clumsy hat switch – merely turn your head slightly to one side and you'll instantly make visual contact.

This latest version of the TrackIR offers a couple of noticeable improvements over its predecessors. First of these is the new software, which makes setting up the range of motion for your preferences a breeze. The biggest new feature is the inclusion of a virtual head preview mode, which draws a virtual head on screen to show you how your tweaking has affected its movement in game. It makes a huge difference and will save untold hours of fooling around.

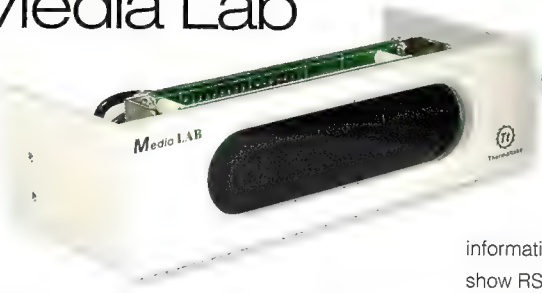
But the biggest innovation is the new Vector kit, which comes at an additional cost. A special frame clips to the TrackIR hat, which when in use will make you look like the geekiest gamer to have ever existed. You won't mind though, as the ability to zoom in on instruments simply by moving closer to the camera, as well as move from side to side and up and down, makes it all worth it. It's not quite as smooth as the panning offered by standard TrackIR use, but it's definitely handy for zooming in on instruments and MFDs.

Although we only tested this wonderful gadget with LOMAC 1.1 Flaming Cliffs and Pacific Fighters, it apparently also supports a host of car sims such as GTR (it can even work in the vehicles in BF2, albeit at a much reduced functionality). If you don't already have a TrackIR and call yourself a simmer, you should be cursing Santa if he didn't stick one in your stocking for Christmas!

BR

score 9.0 OUT OF 10

Thermaltake Media Lab



specs

Price **$180**
Supplier **Thermaltake**
Website **www.thermaltake.com.au**
Specifications **Available in black and silver; 5.25"; IR remote; 10m reception distance; 90° reception angle.**

Yes, we know what you're thinking – another bloody VFD. The Media Lab is different however, in that it is targeted at a market other than overclockers and tweakers – the HTPC market. The Media Lab is for all intents and purposes a re-badged Soundgraph iMon VFD without the volume knob, and as such is bundled with their software and remote.

It connects to your PC in three ways – to a USB port or header on the motherboard for data, to a wire extended from a pass-through adapter for your 24 pin power connector for power, and to the motherboard power pins. The latter enables one of the more fun features, allowing you to power on your PC via the remote. The power button on your case isn't rendered useless though, as it can be connected to the Media Lab as well so you can get the best of both worlds.

The remote is nicely constructed and, once the software is installed, is capable of navigating pretty much anywhere around Windows, with a directional pad emulating the mouse, and numerous buttons replicating vital keys and mouse clicks. Being IR, it is line of sight, however since the receiver is inset into the bay this interferes with reception, making it more finicky than it needs to be.

Software is decent too, allowing custom assignments to be added to most remote buttons (either universal or program specific), and even allows you to program macros, letting you load your favourite pr0n movie in one hit.

Also included is Multi-Median, iMon's version of Media Centre. While it does the job, it can be frustrating to navigate and you may find more joy in sticking with mainstream players, for which the VFD has support anyway.

Speaking of the VFD, other than media information, it can also show RSS feeds, email alerts, world weather and time, local date/time, system info and a graphic equalizer – however configurability of these is minimal compared to most VFDs on the market. For example, although you can specify what options you want to show, you can't tell it what order to display it in, how long it is to display, or even cycle backwards or forwards through displays. There'll be no programming of this board with the default software.

For modders, this is most likely a no go zone, however for HTPC DIYers, the Media Lab would be a brilliant addition to your kit.

CS

score 7.0 OUT OF 10

CREATIVE

STYLE YOUR MUSIC™

Creative I-Trigue 3400

STYLE YOUR ENTERTAINMENT

Experience stunning performance. Enjoy ultra-sleek design. The I-Trigue 3400 is a top-of-the-line speaker system that lets you enjoy the best of both worlds. Featuring two stylishly designed satellites, each boasting three high-precision NeoTitanium dome micro-drivers and a powerful wooden sub with a 6.5" long-throw driver, the I-Trigue 3400's design complements any living room, while also delivering impressive sonic accuracy and clarity with a clean, strong bass.

- Advanced NeoTitanium Tri-Array™ speaker technology for accurate, balanced and natural sound
- Powerful wooden subwoofer with a huge 6.5" long throw driver for louder and deeper bass
- Dual-flared port for lower and cleaner bass response
- Wired remote control with a large, easy to manage volume dial and bass level control for personalised adjustment
- Auxiliary input with exclusive cable for easy connection to your portable audio player
- Video game adapter for instant connection to your home entertainment device

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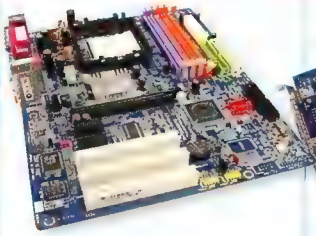
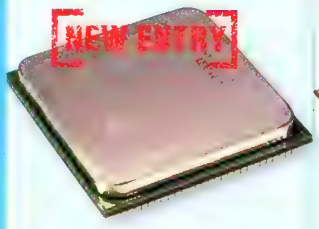
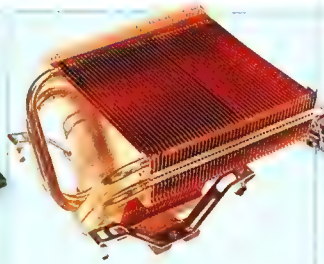
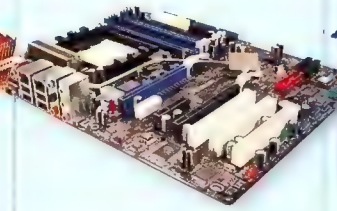
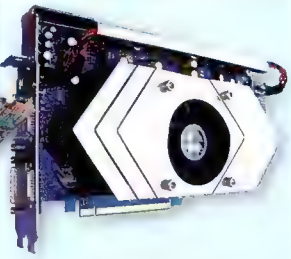
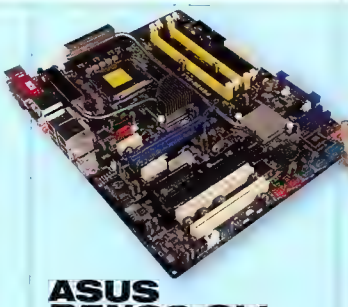
kitlog

Got gear? Use our kitlog matrix to find the best upgrades for your needs.

There's nothing sexier than new kit. And if you're in the market to buy, you don't want to waste your hard earned cash. Let *Atomic* advise you, with our new section for recommended kit! All of these products have been reviewed in *Atomic*. To make it easy we've created a matrix of categories for you to cross reference, so if you're buying for yourself (*Extreme*) or your hardcore granny (*Budget*), you know where to spend your cash.

	CPUs	Coolers	Motherboards	Video cards
BUDGET				
	AMD Athlon 64 3200+ RRP $290 It's been around for some time, yet still remains one of the top performers for the money. Well worth a 'budget' look. Reviewed in **Issue 53 – Page 70**	**Thermaltake Golden Orb II** RRP $49 For such a large and effective heatsink the price is hard to beat. It's low profile too, so should fit in all sorts of cases. Reviewed in **Issue 58 – Page 33**	**Gigabyte GA-K8VT890-9** RRP $139 Sporting VIA's K8T890 chipset, this Socket 939 board is perfect for the low budget while still packing a powerful punch. Reviewed in **Issue 54 – Page 55**	**Sapphire X800GTO Fireblade** RRP $280 The Sapphire X800GTO RADEON Fireblade is a power packed performance beastie. Reviewed in **Issue 59 – Page 35**
PERFORMANCE				
	AMD Athlon FX-60 RRP $TBA Unlocked multipliers mean joy in our book, and for some hot dual core lovin' action, you can't go past the FX-60. Reviewed in **Issue 61 – Page 35**	**Thermalright XP-90C** RRP $99 Thermalright built its business around effective coolers, and the XP-90C is one of the best money can buy. It looks secks too! Reviewed in **Issue 58 – Page 33**	**ASUS A8N-SLI Premium** RRP $320 If stability and performance are important, the A8N-SLI Premium is simply one of the best boards moolah can buy. Reviewed in **Issue 56 – Page 41**	**ASUS N7800GT DUAL** RRP $1499 Yegads this card is ***massive,*** and so is its performance. You may now repeatedly spank the monkey. Reviewed in **Issue 59 – Page 41**
EXTREME				
	Intel Pentium 4 3.73GHz Extreme Ed RRP $1590 When raw MHz and boasting rights count, the P4 3.73 GHz EE is your man – er, processor. Reviewed in **Issue 54 – Page 54**	**Thermaltake Symphony** RRP $449 Flamin' heck. Towering at 1.1m tall, this beastie will have peers ogling in jealousy. It's complete overkill – and we love it. Reviewed in **Issue 60 – Page 54**	**ASUS P5N32-SLI DELUXE** RRP $399 It doesn't get better than NVIDIA's new SLI x16 platform and dual-heat-pipe cooling for the Pentium. Reviewed in **Issue 59 – Page 45**	**Leadtek 7800 GTX TDH EXTREME SLI** RRP $995 x2 There's so much beef in two of these you could open your own market selling, like, beef. Or noodles. Yum. Reviewed in **Issue 59 – Page 46**

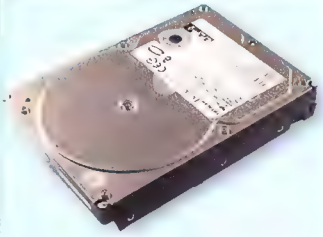
Hard drives

Maxtor MaxLine III 300GB

RRP $259

These 300GB drives are fast and sweet, and yet the price is just right, nigh on a dollar per GB.

Reviewed in **Issue 57 – Page** 31



Hitachi Deskstar 7K500

RRP $572

With the 'Deathstar' spectre long faded, Hitachi's 500GB super quiet SATA II drive with 16MB cache impressed us greatly. Hugely, in fact.

Reviewed in **Issue 60 – Page 49**

Western Digital Raptor WD740GD

RRP $285

It may be small for the size but it's the fastest SATA drive money can buy. RAID two and you're sitting pretty!

Reviewed in **Issue 57 – Page 31**

Monitors

BenQ FP71V+

RRP $599

This 5ms 17in LCD is cheap and speedy, and plenty good enough for even the most fussy of grandmas. Send her your love today!

Reviewed in **Issue 54 – Page 48**

Samsung 930BF

RRP $899

Clocking in at 4ms, despite the plain fascia this gorgeous 19" screen has a colour depth and tonal range that will make you weep.

Reviewed in **Issue 54 – Page 48**

Dell 3007WFP

RRP $2,899

Thirty inches. 2560x1600. 11ms G2G. If you can handle the size and have the cash to buy this massive beauty, you won't be disappointed.

Reviewed in **Issue 61 – Page 49**

Speakers

KOSS SB40

RRP $129

You'll find that these circumaural boomers will do you justice just fine if you can't afford a THX 7.1 platinum plated surround sound setup.

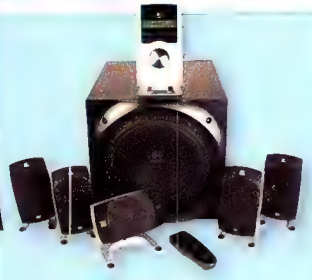
Reviewed in **Issue 38 – Page 30**

Altec Lansing MX5021

RRP $349

This 2.1 set is for those after a decent yet simple setup. The best 2.1 speaker set money can buy, and the next best thing before 5.1.

Reviewed in **Issue 47 – Page 85**



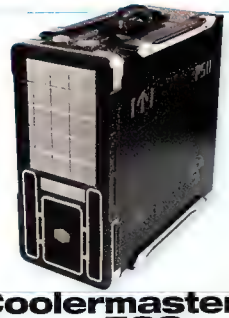
Logitech Z-5500 Digital

RRP $749

Able to play the 'liquid gold' sound that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike with equal impunity.

Reviewed in **Issue 48 – Page 56**

Cases



Coolermaster Ammo 533

RRP $100

Perfect for LANs with its heavy duty handle, military styling and rugged construction, the Ammo blasts the budget competition away.

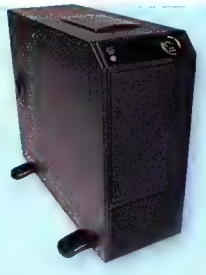
Reviewed in **Issue 60 – Page 50**

Coolermaster Stacker 830

RRP $340

Following in the tradition of the Stacker before it, this sensational Stacker stacks sumptuous specifications salaciously.

Reviewed in **Issue 56 – Page 39**



Nextherm ICS 8200

RRP $470

Packing a peltier with an LCD temperature readout, you can't go past a case this cool (literally) case and not want to kiss it all over.

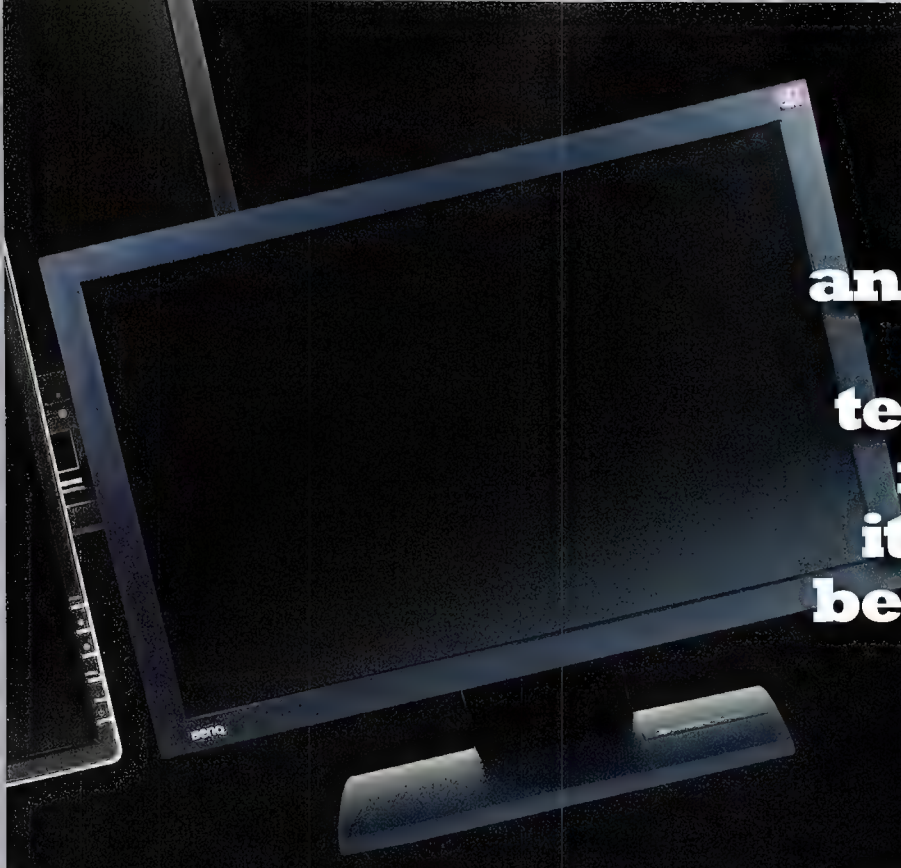
Reviewed in **Issue 54 – Page 50**

PANEL

Craig Simms went looking for all the fastest, biggest and meanest monitors he could find, got all cosy and warm with them in labs, and discovered that size really does matter.

They say that a monitor is the window into a PC's soul. Or quite possibly their owners wallet, as it can easily be the most expensive component of a system. Long gone are the days when it was as simple as finding a tube below a certain dot pitch – Thin Film Transistor (TFT) is the new battleground, and with so many variances in technology, now more than ever it's important to be equipped with the knowledge required for your ultimate purchase. With the increase in size and widescreen gaming at the larger end of the scale, and the plummeting response times at the smaller, we felt it our duty to gather up the fastest and biggest monitors from every major manufacturer, and throw them head first into an all in brawl.

TFT is the new battleground, and with so many variances in technology , now more than ever it's important to be equipped with knowledge.



BEATING

TECHIN' IT HARD

There are three different types of TFT panels currently on the market. To understand them though, first we must look at the technology that is common to all – the liquid crystal.

Liquid crystals are a near transparent substance that behave as part solid and part liquid. While the substance moves like a liquid, the molecules within the liquid can be arranged in a crystal like fashion. This arrangement can be altered by applying an electrical charge.

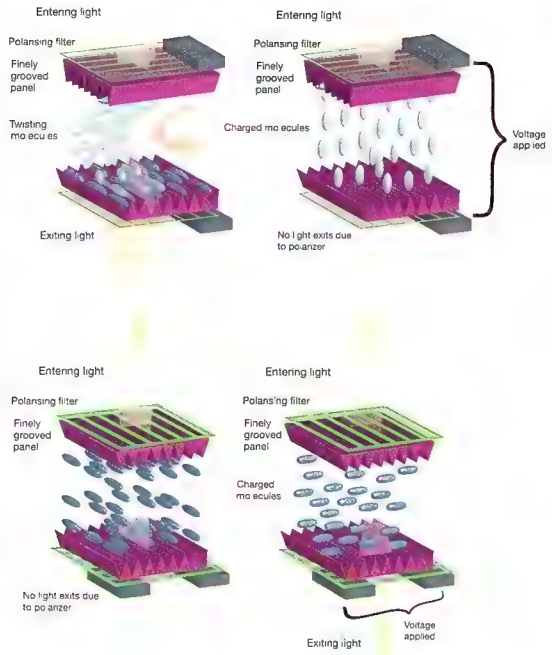
In their natural state, the molecules align roughly parallel to one another. However, as they are within a body that acts like a liquid, when introduced to a grooved surface they tend to fall within the troughs of that surface, aligned parallel with the grooves. Think of it like dropping bullets onto corrugated iron – they naturally fall within the troughs, aligned lengthways.

Basic LCD technology sandwiches liquid crystals between two finely grooved surfaces, with the grooves of one surface perpendicular to the other. A row of molecules exists behind every single pixel or sub-pixel. When there is no charge, those molecules squished into the top layer's troughs sit idle. Those in the bottom are similarly idle but perpendicular to those at the top, and those in between are caught rotating in a helix like fashion from one angle to the other, or 'twisted'. Light will follow the angle of the molecules, so when shone from the rear it will be twisted 90 degrees before it hits the front.

When a charge is applied across the two surfaces however, the molecules will re-orientate themselves perpendicular to the two planes they're squashed between, allowing light to pass through unhindered (See diagram, next page).

Outside the two grooved layers are polarising filters – essentially a set of fine parallel lines formed from some sort of polymer. By nature, light travels at random angles, so the polarising filter is there to make sure that only those wavelengths that run parallel to the wires are let through. The rest are dissipated by heat or re-emitted elsewhere.

These lines usually run parallel to the grooves of the layer above. So when the back light is turned on and no charge is applied, light enters the first polariser from many angles, is filtered into one, twists 90 degrees through the molecules, and is then emitted through the front of the panel via the second polariser. However when a charge is applied, the molecules no longer twist the light, it is blocked by the second polariser and to the viewer the screen appears black (See diagram). Different voltages applied will affect the degree of twist (or polarisation), and this in turn will affect the intensity of the pixel. Colour is simply applied by separating each pixel into three sub-pixels, and filtering them to red, blue or green. Each of these sub-pixels can be altered in intensity to provide the required colour for each overall pixel. For those who remember their high school physics, all three lit at brightest intensity will produce white light. Now, if you've got all that, then you rock!



ABOVE: A TN panel in off and on state. A charge is actually only applied to one electrode. BELOW: IPS in action. Note the electrodes are placed across one panel, rather than two. Both are charged in this case.

Your standard LCD has a voltage applied across each cell, which is fine for calculators, but for larger displays such as monitors, a smarter method of control than adding millions of connections to the super small sub-pixels is required. This is where the TFT comes in. An array of transistors are added to the surface, otherwise known as an active matrix. Each sub-pixel is attached to a transistor. A voltage is then applied to an entire row of pixels, and then one of opposite polarity is applied to a column. The intersecting transistor is switched when its minimum potential difference is reached, which then allows the applied voltage to flow through and affect the intensity of light that the pixel or sub-pixel displays.

So now we know the basics (easy!), let's look at the technology that was born from these, so you know what exactly we're buying.

Twisted Nematic (TN)

A TN panel uses the basics as outlined above – the degree in twist of a molecule determines the intensity of light. 'Nematic' describes the property of the liquid crystal that allows the molecules to form in loosely parallel lines. These panels are the cheapest to produce, have the fastest response time, but also the poorest colour reproduction, usually only being able to display 18 bits of colour compared to the usual 24. This shortcoming can be mostly overcome by quickly cycling sub-pixels through different shades to give the effect of intermediate shades, although this effect may be noticeable to the end user. The crystals in a TN panel are aligned so that when a voltage is applied, they orientate perpendicular to the screen. When they are at rest however, those at the surface sit at a slight angle instead of being parallel, which causes a poorer viewing angle than competing technologies. When viewed outside its specified viewing angles, the panel has a tendency to appear darker from certain angles, or tinted a yellowish-brown.

Super In-Plane Switching (S-IPS)

The IPS standard was initially developed in order to reduce the viewing angle problems caused by the TN solution. This has since been extended to S-IPS. Its Achilles heel is a slightly worse contrast ratio than competing standards. The crystals are aligned so that when a voltage is applied, they orientate parallel to the screen – this is achieved by applying voltages at both ends of the crystal, requiring two transistors instead of one (see diagram to the left). This requires a brighter backlight in order to penetrate the extra circuitry, requiring more power, and overall driving up costs. Unlike TN, IPS screens are filtered so light shines through in their active state (when voltage is applied), and is blocked in its passive state. IPS response times are typically slower than competing technologies. When viewed outside its specified viewing angles, it takes on a violet tint.

Vertical Alignment (VA)

The original form, Vertical Alignment (VA) was developed to be the middle ground between TN and IPS. This angled the molecules at 45 degrees to the user when charged, but presented a problem – when looking from straight on, a grey pixel would appear grey, but if the view was shifted to one side it would appear white (seeing the flat side of the molecule rather than the angle), and from the other it would appear black. This was overcome through Multi-Domain Vertical Alignment (MVA), which segmented a pixel cell into at least two domains, one section containing molecules perpedicular to the second. This way one segment's bright side was complemented by the other's dark side, overall evening out the effect. Typically there are four segments in total to compensate for vertical adjustment as well, however Samsung's S-PVA uses eight segments to take the diagonals into account too. The main difference between MVA and PVA is that MVA uses physical barriers to segment the cells, while PVA uses offset electrodes and the field effects of the voltages applied to create an electrical separation. Like IPS, an MVA/PVA cell shines light through when it is active, and tends to have the highest contrast ratio of all the technologies.

With all this in mind, some terms start to make sense. For example, a 'dead pixel' is simply a faulty transistor, causing a sub-pixel to be either permanently locked on or off. 'Response time' isn't so much how long it takes a pixel to react, but more so the period taken for the molecules to move from one angle to their required angle, whether it be from one that produces black to white, or grey to a lighter shade of grey.

It is said that grey to grey response time is more important than black to white, and this is true enough. In general use, colours on a screen do not often shift with such great contrast as black to white. To look at this in a technical manner, the more voltage you apply, the quicker the molecules snap into line. So black to white can be achieved quickly by simply applying an overly large voltage. However, subtle changes in shades require finer control and hence lower voltage to rotate the molecules slightly – meaning the rotational speed of the molecule is actually slower, even if the overall time to achieve the change may be less than a black to white shift due to the lesser distance travelled.

So How Exactly Did We Test?

With lots of coke, pizza, DVDs and games. Oh, you mean the hardware! Right – we set up a Gigabyte Quad Royal with four Geforce 7800GTs acting independently, and then used a DVI splitter to replicate an image across monitors of the same resolution. If a screen supported the sRGB colour mode, it was enabled, and all screens were then calibrated and tested with DisplayMate 2.1. Motion was tested using a fast moving HDTV sample, and gaming by playing Far Cry over an extended period of time. And yes, we loved every minute of it.

BenQ FP91V

Size **19"** Aspect Ratio **5:4** Price **$799** Supplier **www.benq.com.au**
Technology **TN** Res **1280x1024** Claimed Response **4ms G2G**
Contrast Ratio **550:1** Brightness **270cd/m²**
Viewing Angle: **140 Horizontal, 135 Vertical** Inputs **VGA/DVI** Warranty **3 Yrs**
Dead Pixel Policy **Replacement within 7 days of purchase for any defect; afterwards any more than 2 bright, 5 dark or 5 faulty pixels in total, or any defects within the central ninth of the screen.**

The only monitor in the roundup to feature speakers, the BenQ impressed greatly with its image quality and excellent response in the fiercely competitive 19in range. It performed well in the DisplayMate tests, displaying a minimum black level of 4 and a maximum white level of 252. There was however noticeable banding across the colour and grey intensity ramps, which we found was common across all BenQ monitors in the roundup. The OSD buttons are situated under the bezel, and can therefore be a pain to use. The symbols for the buttons are indented into the silver fascia, which can be difficult to read even in ordinary light levels, let alone low ones. In terms of adjustment it only supports tilting, and cord management is handled by threading neatly through a hole in the neck. The FP91V has amazingly vibrant colours, but as a side effect images can appear a little burnt out, resulting in flanging whites while we were testing Far Cry – something that ultimately cost it the crown, if only by the smallest of margins.

score **8.5** OUT OF 10

CMV CT-934D

Size **19"** Aspect Ratio **5:4** Price **$499** Supplier **www.impactsystems.com.au**
Technology **TN** Res **1280x1024** Claimed Response **8ms B2W**
Contrast Ratio **500:1** Brightness **320cd/m²**
Viewing Angle: **160 Horizontal, 130 Vertical** Inputs **VGA/DVI** Warranty **3 Yrs**
Dead Pixel Policy **Replacement within 30 days of purchase for any defect; afterwards any more than 3 bright, 5 dark, or 5 faulty pixels in total.**

The CT-934D is the cheapest screen in our roundup, and sadly it shows. Despite the claimed wide viewing angle, when moving out of range it turns an obvious yellow/brown hue very quickly, something not displayed by any of the other monitors. In terms of DisplayMate tests it performed decently, ranging from a black level of 2 to a 254 white, yet showed noticeable banding in the ramp tests. The colour spectrum test was where the CMV fell down hardest, displaying large blocks of dithered colour rather than a smooth gradient. Motion was acceptable, although a slight blurring was perceivable in both movies and gaming. The OSD is a little confusing to navigate at first, due to there being both up/down and left/right buttons, but this is quickly adapted to. The bezel can only tilt, and the neck features plastic braces to hold cords neatly. In saying this the CT-934D still does the job it's meant to do, but unless you're using it as an office monitor, or are on an incredibly restrictive budget, there are better options available.

score **6.5** OUT OF 10

Mitsubishi Diamond Digital DV197SB

Size **19"** Aspect Ratio **5:4** Price **$699** Supplier **www.mitsubishi-electric.com.au**
Technology **TN** Res **1280x1024** Claimed Response **8ms B2W**
Contrast Ratio **550:1** Brightness **270cd/m²**
Viewing Angle: **140 Horizontal, 120 Vertical** Inputs **VGA/DVI** Warranty **3 Yrs**
Dead Pixel Policy **More than 4 bright/8 dark separated by a minimum distance of 15mm; or 4 bright/ 3 dark horizontally connected, or exceeding 8 defects.**

With a minimum black level of 2 and a maximum white of 253, the DV197SB has a good range, although like the CMV it suffers in the colour spectrum test, reproducing blocks of colour instead of a smooth gradient, albeit not quite as badly as the aforementioned model. During video and gaming it blurs very slightly, but is within acceptable limits. OSD controls are slightly confusing at first, but once you learn that the button marked 'Auto' exits from all menus, things become nicer. The screen has both tilt and height adjustment, and is one of the few monitors in the round-up to feature a power brick rather than a direct AC connection. Cable tidying is handled by a horizontal hole in the neck. The frame surrounding the panel itself is the thinnest of the lot, giving the impression of a larger screen – something we think all manufacturers should aspire to, within the limits of structural integrity, of course. Overall the Mitsubishi lands squarely in the middle of the pack, and would go well on all but the most discerning of viewer's desk.

score **7.0** OUT OF 10

Samsung 930BF

Size **19"** Aspect Ratio **5:4** Price **$899** Supplier **www.samsung.com.au**
Technology **S-PVA** Res **1280x1024** Claimed Response **4ms G2G**
Contrast Ratio **700:1** Brightness **270cd/m²**
Viewing Angle **160 Horizontal, 160 Vertical** Inputs **VGA/DVI** Warranty **3 Yrs**
Dead Pixel Policy **Replacement within warranty period due to any pixel defect.**

This unassuming monitor featured the best colour range in the 19" class, most likely due to being the only PVA panel. Displaying a black level of 3 and a white level of 251 in DisplayMate, it doesn't have the greatest range of the lot, however its colour spectrum is very impressive, with the ubiquitous cyan and yellow banding giving way instead to an evenly balanced gradient, something not seen on any other screen in the roundup. Video and gaming is delicious, with some of the richest colours seen in the labs and no noticeable blurring. Adjustability is limited to tilting, and cord management is achieved through a plastic snap-on back, which more hides clutter more than it tidies it. It is a two-part monitor, requiring the panel and neck to be snapped into the base. In the tightly contested 19" field, ultimately it was the 930BF's superb tonal range and rich colours, best represented in the paradise world of Far Cry, that propelled it ahead of the competing Viewsonic and BenQ options, leaving it to walk away the winner.

score **9.0** OUT OF 10

Samsung 960BF

Size **19"** Aspect Ratio **5:4** Price **$999** Supplier **www.samsung.com.au**
Technology **TN** Res **1280x1024** Claimed Response **4ms G2G**
Contrast Ratio **700:1** Brightness **300cd/m²**
Viewing Angle **160 Horizontal, 160 Vertical** Inputs **DVI** Warranty **3 Yrs**
Dead Pixel Policy **Replacement within warranty period due to any pixel defect.**

Doing its best impression of an iMac, the 960BF is the TN variant of the 930, with the only different spec, other than the panel type, being the brightness. The DisplayMate tests for the most part were on par with its PVA cousin, almost matching even the colour range – most impressive for a TN panel. The white levels however only managed a maximum of 248 instead of the prior 251. There is only one video input – DVI – however older video card users are covered by the inclusion of a DVI to D-Sub cable, rather than the usual adapter. It features absolutely no OSD controls, which we found a little disconcerting, and rather than a direct AC connection, it is attached to a power brick, which despite being on for extended periods of time remained cool. The 960BF had the best adjustability of the lot, allowing tilt, height and rotate functions. Unfortunately some odd flickering effects were occasionally visible in Far Cry, leaving us to recommend this as an excellent general use monitor, but for gaming, there's no reason to choose this over the 930.

score **8.0** OUT OF 10

Viewsonic VX922

Size **19"** Aspect Ratio **5:4** Price **$849** Supplier **www.viewsonic.com.au**
Technology **TN** Res **1280x1024** Claimed Response **2ms G2G**
Contrast Ratio **650:1** Brightness **270cd/m²**
Viewing Angle **170 Horizontal, 170 Vertical** Inputs **VGA/DVI** Warranty **3 Yrs**
Dead Pixel Policy **Replacement within 90 days of purchase for any defect. Thereafter within warranty period any defect pixels within central ninth of the screen, more than one within the top, bottom, left and right ninths, and more than two in the diagonal ninths required for replacement.**

The successor to the much hallowed VX924, the 922 boasts a 2ms G2G response time – although in practice we couldn't differentiate this performance-wise from any of the 4ms screens. Reaching from a black level of 6 to a white level of 253, there was slight but noticeable banding in the colour/grey ramps, and a better than usual gradient represented in the colour spectrum test. Video and gaming is excellent as is to be expected from Viewsonic, however colours appeared slightly washed out and featured lesser tonal range compared to the Samsung screens, with the lush Far Cry environment looking faded as a result. The menu is nice and easy to navigate, with clearly marked front-mounted buttons. Like the 930BF it only features a tilt adjustment and also has a snap-on back to reduce visible cable clutter. The Viewsonic is perfect for any gamer's home, but in our opinion the Samsung is worth the extra dollars.

score **8.0** OUT OF 10

BenQ FP202W

Size **20"** Aspect Ratio **16:10** Price **$999** Supplier **www.benq.com.au**
Technology **P-MVA** Res **1680x1050** Claimed Response **8ms B2W**
Contrast Ratio **600:1** Brightness **300cd/m²**
Viewing Angle **170 Horizontal, 170 Vertical** Inputs **VGA/DVI** Warranty **3 Yrs**
Dead Pixel Policy **Replacement within seven days of purchase for any defect; afterwards within warranty period zero bright, five dark, or five faulty pixels in total, or any defects within the central ninth of the screen.**

The 20" market is one that is gaining traction at a decent rate, providing an entry level for widescreen goodness. The BenQ is one of two such monitors in the roundup, and performed admirably in the DisplayMate tests, with a 2 black to 254 white tonal range. The slight banding present in the FP91V also turned up here in the intensity ramps and colour spectrum, and an ever so slight blurring was detectable in video. Gaming fares worse, with bearable but definite ghosting in Far Cry. Construction is solid, although only a tilt function is available, with sadly no height or swivel function that we would have expected for a monitor of this size. Annoyingly the OSD buttons are not on the front but on the right side of the bezel, meaning you have to lean around to the side just to see what you're doing. Cable mess is managed by a flip down polymer loop on the back of the neck. At this point, gamers would be better off choosing a size either side of 20".

score **7.0** OUT OF 10

Dell 2005FPW

Size **20"** Aspect Ratio **16:10** Price **$1,299** Supplier **www.dell.com.au**
Technology **S-IPS** Res **1680x1050** Claimed Response **16ms B2W**
Contrast Ratio **600:1** Brightness **300cd/m²**
Viewing Angle **176 Horizontal, 176 Vertical** Inputs **VGA/DVI/Composite/S-Video/4xUSB** Warranty **Up to 3 Yrs** Dead Pixel Policy **Replacement within 15 days of purchase if not satisfied for any reason (total satisfaction policy), afterwards more than six defective pixels or a number of closely banded pixels within warranty period, need to call Dell support.**

In terms of functionality, the 2005FPW is almost a perfect miniature of its 24" brother, to the degree that it even uses the same stand – allowing for unrivalled tilt, swivel, rotate and height adjustability. Only the component input has been sacrificed due to the smaller size of the panel, with the same excellent Picture in Picture, Picture by Picture, input selector and menu system being present. DisplayMate tests provided a nicely smooth spectrum, with minimal banding in the intensity ramps. Not quite as impressive as the 2405 in tonal range, it managed a black level of 4 and a white level of 254. Video was excellent, however gaming produced a small amount of ghosting, albeit less than the BenQ. Cable tidy is achieved by a pair of braces on the back of the stand. For general use or if you're a photographer, the 2005FPW is an excellent monitor – however for gamers once again you're better off going either smaller or larger.

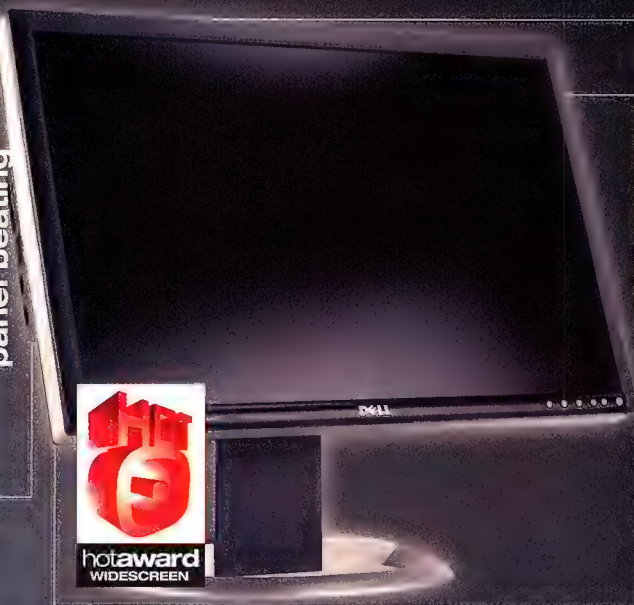
score **8.0** OUT OF 10

BenQ FP231W

Size **23"** Aspect Ratio **16:10** Price **$2,799** Supplier **www.benq.com.au**
Technology **S-IPS** Res **1920x1200** Claimed Response **16ms B2W**
Contrast Ratio **600:1** Brightness **300cd/m²**
Viewing Angle **176 Horizontal, 176 Vertical** Inputs **VGA/DVI/S-Video/Composite/4xUSB** Warranty **3 Yrs** Dead Pixel Policy **Replacement within seven days of purchase; afterwards within warranty period zero bright, five dark, or faulty pixels in total, or any defects within the central ninth of the screen.**

Entering the high end of the size scale, the BenQ FP231W is one hunk of a monitor. Supporting a tonal range of 1 black through to 249 white, it displayed the same colour banding in the spectrum/intensity tests that was present across the other BenQ models. A very solid neck allows both tilt and massive height adjustment, extending far enough to make for comfortable viewing while standing. While it can swivel, the motion is stiff – often resulting in the entire unit turning instead of just the panel due to the too-light base. Like its 20" counterpart, buttons are annoyingly placed on the side, although this time on the left. A pair of plastic braces are attached to the base for cable tidy. This is one of the few monitors in the roundup to feature a power brick, which – in the case of our review sample – hissed at a high pitch whenever drawing power. This may not be the case for all units though. Video was excellent with minimal blurring, and gaming was decent. Although an excellent monitor in its own right, the FP231W is hard to recommend in the face of the $900 price difference between it and the Dell 2405.

score **7.5** OUT OF 10



Dell 2405FPW

Size **24"** Aspect Ratio **16:10** Price **$1,799** Supplier **www.dell.com.au**
Technology **S-PVA** Res **1920x1200** Claimed Response **12ms G2G**
Contrast Ratio **1000:1** Brightness **500cd/m²**
Viewing Angle **1178 Horizontal, 178 Vertical** Inputs **VGA/DVI/Composite/S-Video/Component/9-in-1 card reader/4xUSB** Warranty **Up to 3 Yrs** Dead Pixel Policy **Replacement within 15 days if not satisfied for any reason (total satisfaction policy), afterwards more than six defective pixels or a number of closely banded pixels within warranty period, need to call Dell support.**

If you picked up *Atomic* 60, you already know this monitor is, in gaming speak, 'teh win'. Utterly blitzing the DisplayMate tonal tests, it managed to display the full 255 grey tones with ease. Intensity ramps and spectrum tests revealed an acceptable level of banding, with video and gaming being sublime – assuming you have the video card grunt to run 1920x1200. The excellent stand allows rotating, tilting, swivelling and height adjustment, and the panel can be detached if need be. Featuring all the inputs of the smaller 20", it also adds a 9-in-1 card reader for photography enthusiasts and component for better quality external video. This is a true multimedia workstation. Gaming displays no noticeable ghosting and video is brilliant, assuming you play something worthy of the resolution. But over time you discover that damn, this display is bright – perhaps too bright for some – but as always, that's the advantage of OSD tools. Throw in the exceptional price and there is no doubt that the 2405FPW is the undisputed king in this roundup.

score **9.5** OUT OF 10

Sony PremierPro SDM-P234

Size **23"** Aspect Ratio **16:10** Price **$3,099**
Supplier **www.sony.com.au** Technology **S-IPS**
Res **1920x1200** Claimed Response **16ms B2W**
Contrast Ratio **500:1** Brightness **250cd/m²**
Viewing Angle **176 Horizontal, 176 Vertical** Inputs **2xVGA/DVI**
Warranty **Up to 3 Yrs** Dead Pixel Policy **Greater than 10 (ISO13406-2 Class II)**

The SDM-P234 is a stylish monitor with a seriously solid aluminium base. The panel is considerably thicker than others in the roundup, with the back sliding up to reveal all the inputs – nice in theory, but a pain in practice due to the lack of a locking mechanism. The only adjustment available is tilting, and a power button adorns the top. The navigation buttons on the Sony are simply beautiful, acting like the touch pads out of Star Trek, lighting up a soothing white when you brush your fingers across. The Sony logo is lit permanently with the same white light, however this can be turned off if you desire. Tonal range was impressive, ranging from one black to 254 white, however colour banding in the spectrum tests was very obvious, separating what should be a gradient into big slabs of colour. Gaming is surprisingly good, with so little ghosting it almost reached the Dell level of performance. Sadly all this quality comes at an exorbitant price, leaving us to point to the Dell once more.

score **7.0** OUT OF 10

Samsung 460PN

Size **46"** Aspect Ratio **16:10** Price **$10,999** Supplier **www.samsung.com.au** Technology **S-PVA** Res **1366x768**
Claimed Response **8ms B2W** Contrast Ratio **800:1** Brightness **500cd/m²**
Viewing Angle **178 Horizontal, 178 Vertical** Inputs **VGA/DVI/ BNC(analog/component)/S-Video/Ethernet** Warranty **3 Yrs**
Dead Pixel Policy **Replacement within warranty period due to any pixel defect.**

There comes a time where even the biggest of the big isn't, well, ***big enough***. Your lust for inches (take that as you will) remains unfettered, unfulfilled and ultimately unrequited and you just have to go bigger.

So we did.

Samsung, bless 'em, sent us this behemoth of screen real estate made manifest in the Samsung 460PN. In fact, if resolution were land mass, this remarkable monitor would be all of North and Sound America combined. Indeed, you could probably throw in Europe as well. At 42", it's just unbelievably ***massive***. And in that instantly falling in love with kinda way.

But we digress. This beefy box gets its own section not because it's simply the biggest ***anything*** we've ever seen, but because to be fair the 460PN crosses into the murky territory of combined TV and monitor. Its primary task is that of a TV, as reflected by its 1366x768 resolution, so it doesn't really compare with the other monitors reviewed here. However it's not a TV alone. It will happily accept PC input not only from classic analog VGA, but hip and trendy DVI as well, making it eminently suitable as a PC display. And it even sports a fast 8ms response time!

And so, naturally, the first thing we did was play games on it. Then we had to change our pants, have a shower, and played more games. Rinse, repeat, and very soon days had gone by without us noticing.

In Far Cry you feel like you're on holiday, with no urge to shoot anything – just stare at the scenery. While there was some banding in the intensity ramps, the spectrum was almost as good as the 19" Samsungs, and the tonal range was impressive, displaying from two to 254.

Dell 3007WFP

Size **30"** Aspect Ratio **16:10** Price **$2,899**
Supplier **www.dell.com.au**
Technology **S-IPS** Res **2560x1600**
Claimed Response **11ms G2G** Contrast Ratio **700:1**
Brightness **400cd/m²** Viewing Angle **178 Horizontal, 178 Vertical** Inputs **DVI, 9-in-1 card reader, 4xUSB**
Other **HDCP compatible** Warranty **Up to 3 Yrs**
Dead Pixel Policy **Replacement within 15 days of purchase if not satisfied for any reason (total satisfaction policy), afterwards more than six defective pixels or a number of closely banded pixels within warranty period, need to call Dell support.**

hotaward EXTREME

Sporting a massive 2560x1600 resolution, the 3007WFP requires a video card with Dual Link DVI-D just to drive it – which most modern graphics cards support, but check to be sure. Gaming is utterly delectable, with the hand that grips your gun in Far Cry being the same size as an actual human hand! It so immersive you have to fight against the compulsion to actually throw grenades at the enemy rather than hit a button. Coming as one giant piece, it allows swivelling and tilt adjustments, and height is managed through a rail system, which is a delight to use. DisplayMate results were very similar to the 2405, with the major difference being a slightly smaller tonal range between 5 and 253. It also displays perfectly sharp at 1280x800 if you don't have the latest and greatest card, but it seems such a shame to run this low a res on such a beast. There is perhaps just one issue, but it's no fault of the monitor – by definition, you need serious grunt to power games at its native res, so SLI would be a boon. However for more than a grand less than Apple's Cinema Display, if you're into photography, 3D/CAD, DVDs or are just a gamer with a lot of money, this is heaven on a substrate.

score **9.0** OUT OF 10

Conclusion

So ultimately, which wins, biggest or fastest? Well it sounds trite, but that much is really up to you. The scale is, quite obviously, set to the width of your wallet. Don't forget that the bigger your resolution gets, the more graphics card power you'll need to drive it. All these monitors can, of course, run at the standard range of resolutions if need be, but the native resolution (or a fraction thereof) will always give you the sharpest picture. Keep in mind also that listed here are the retail prices given to us by manufacturers – you may find the screens for considerably cheaper.

For bleeding edge gaming, the smaller 4ms or less panels add a slightly sharper experience, however one cannot underplay the amazing experience that is playing on a huge widescreen monitor. Or any widescreen monitor for that matter, Once you try it, you can't go back. Widescreen is simply *the win*. And hey, if widescreen isn't for you, there's nothing wrong with having two monitors in dual-configuration setup. Nor is anything wrong with three monitors if you're a coder. Or ten screens for flight sim nuts and massively multi-monitor madness... oh dear, it's going to be hard to send all these lovely monitors back.

The real surprise for us were the Dell displays. They're not exactly the first name you think of when it comes to monitors, but the units they submitted for review not only that performed superbly, but also have exceptional price points too, undercutting a lot of their competition.

Good times are ahead, that's for sure. And with this sort of competition, the winners are you and I.

But lets be honest, this is a screen for people who sweat money. At nearly $11,000, if you can afford to buy this as your gaming display, you deserve to be flogged, or at least you need to invite the *Atomic* crew over for a night of stupendous big screen gaming paid for by you.

With every input under the sun, superb image processing that produces brilliantly bright and sharp images, and no noticeable ghosting the 460PN is simply a visual feast for which words cannot do justice.

If you happen to own a bank, or a number of them, this hybrid TV/monitor is simply as good as it gets. PC, Xbox 360 and Firefly never looked so good. Please, can we keep this?

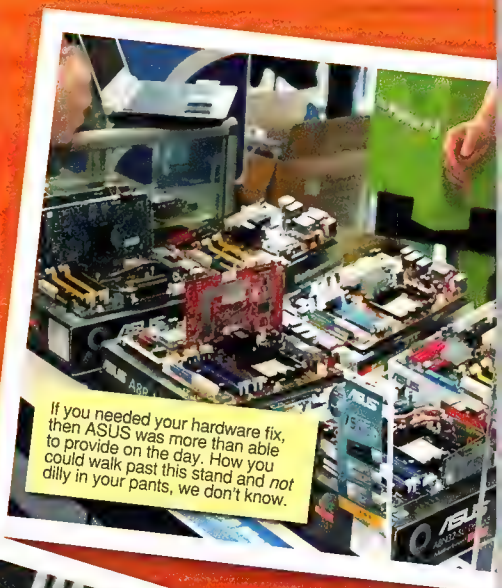
atomic LIVE 2005

ACCESS ALL AREAS

8 December 2005 – The day the Earth stood still and all were amazed by Atomic Live 2005. Yes, it had it all, from games and hardware, to programming and sausages. If you were there to join us in the celebration of the magazine, its readers and all things technical, then you'll know just how good it was. If you missed out then this tribute is for you. Enjoy!

THE EXPO

No awesome technology and gaming event, especially one like Atomic Live, would be complete without an expo. Attendees flocked to the stands, which included Microsoft, NVIDIA, MSI, Albatron, Gigabyte, Seagate, Philips and Vivendi Universal Games, to name a few. Activision even had a LAN area for Quake 4 and Call of Duty players, while ASUS had a visual feast of cutting edge PC hardware just waiting to be drooled over



If you needed your hardware fix, then ASUS was more than able to provide on the day. How you could walk past this stand and *not* dilly in your pants, we don't know.

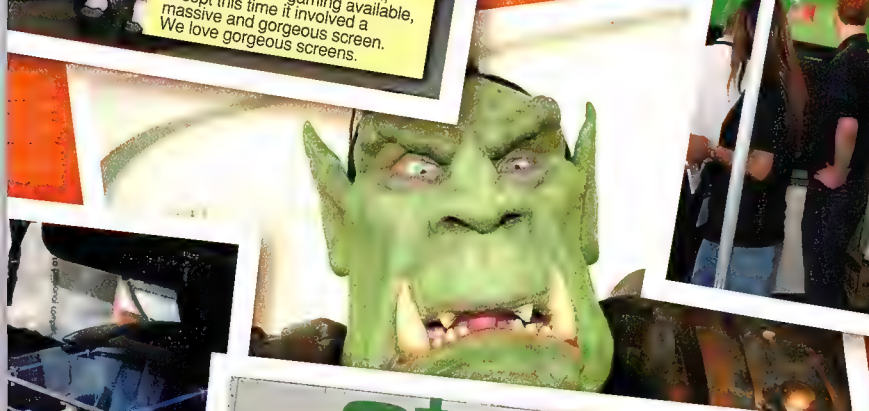
You can take the gamer out of the LAN, but you can't take the LAN out of the gamer. Atomicans just couldn't stop themselves from enjoying the pleasures of Call of Duty 2 and Quake 4 at Activision's stand. Honestly, can you blame them?

Ah, NVIDIA. How we love you. These sweet lasses manned the company's stand, and they were even nice enough to offer hourly prizes on the day. Great!

This, friends, is Raygen's Hotbox that in all its glory won Hotbox of the Month a few competitions back. Easily the best use of LCD screens in a mod ever, and no one could keep their eyes off it.

Albatron had a fantastic stand at Atomic Live. Like Activision, there was some gaming available, except this time it involved a massive and gorgeous screen. We love gorgeous screens.

Everyone meet the Peter Dickison, the guy who built Orac3 (see Hotbox, Issue 50). Although Pete couldn't bring Orac3, he did show us his latest creation – WMD. With a big LED clock and a sleek metal design, all we could say was: 'Hot damn!'



Boy, was Microsoft and Visual Studio Express popular on the day... so popular that MS saw fit to launch its Express line at the event. Suffice to say, everyone was impressed.

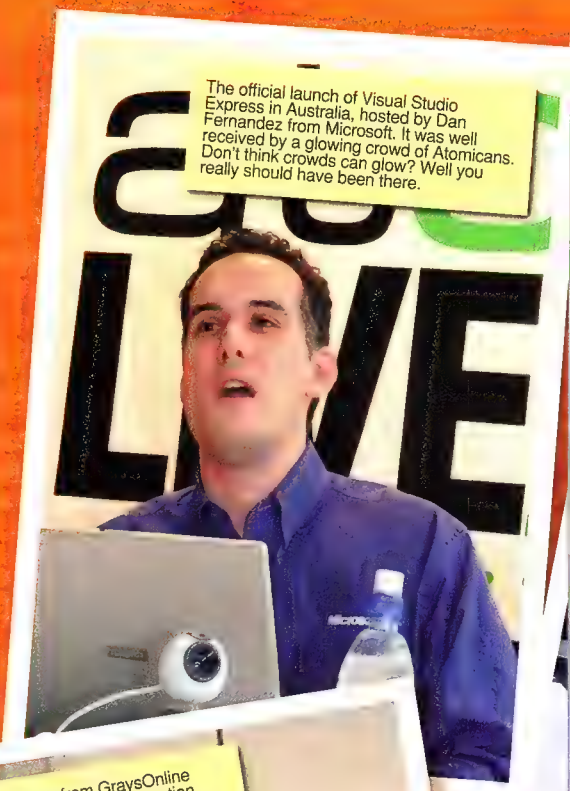
The *Atomic* stand. There were T-shirts, magazines, subscriptions, CDs... the list of cool gear goes on. Attendees had the opportunity to get the magazine a full week before it came out!

Little Ryan spends some time with Vivendi's Night Elf mannequin. You can tell by the bemused expression that he approves. Well, we hope he does.

Many of you will be familiar with Altech, one of the largest distributors this side of the Great Dividing Range. Cases, mobos, video cards... let's just say these guys had it all.

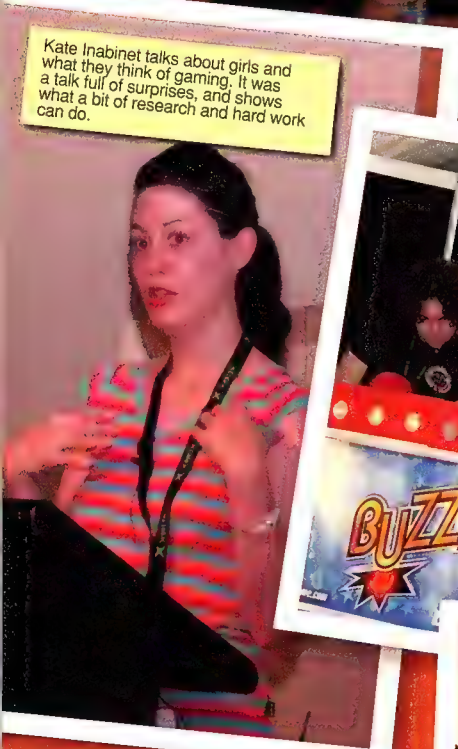
SEMINARS

If you were impressed by the expo, we're happy to say that it wasn't the only thing happening at Atomic Live. Atomicans love entertainment and education (don't be shy, we do too!). So it only seemed right to have a series of talks at the event as well. To this end, we invited Microsoft and Sony to provide the education and the entertainment, respectively, as well as *Atomic*'s terrific Geekette columnist Kate Inabinet to talk about girls and gaming. We also took the opportunity to put the magazine's staff on stage so you guys could throw questions at us like underpants and tomatoes. If that metaphor makes no sense, it didn't do much for us either.



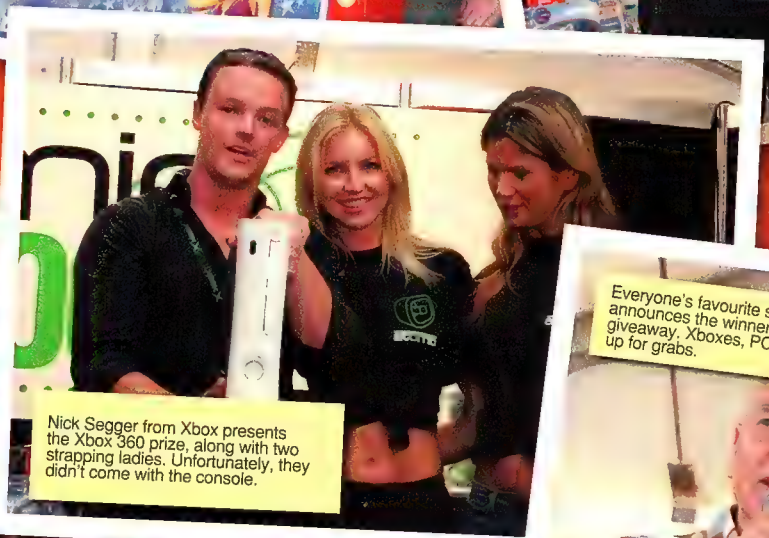
The official launch of Visual Studio Express in Australia, hosted by Dan Fernandez from Microsoft. It was well received by a glowing crowd of Atomicans. Don't think crowds can glow? Well you really should have been there.

From left to right: Nick Ross, Ashton Mills, Logan Booker and Craig Simms talk shop. If there was a question about the mag or tech, we had answers. We also had a lot of water.



Kate Inabinet talks about girls and what they think of gaming. It was a talk full of surprises, and shows what a bit of research and hard work can do.

Michael Hayes from GraysOnline Auctions hosts the charity auction event at Atomic Live. Attendees raised $3335 for the Multiple Sclerosis Society of NSW. Well done guys!

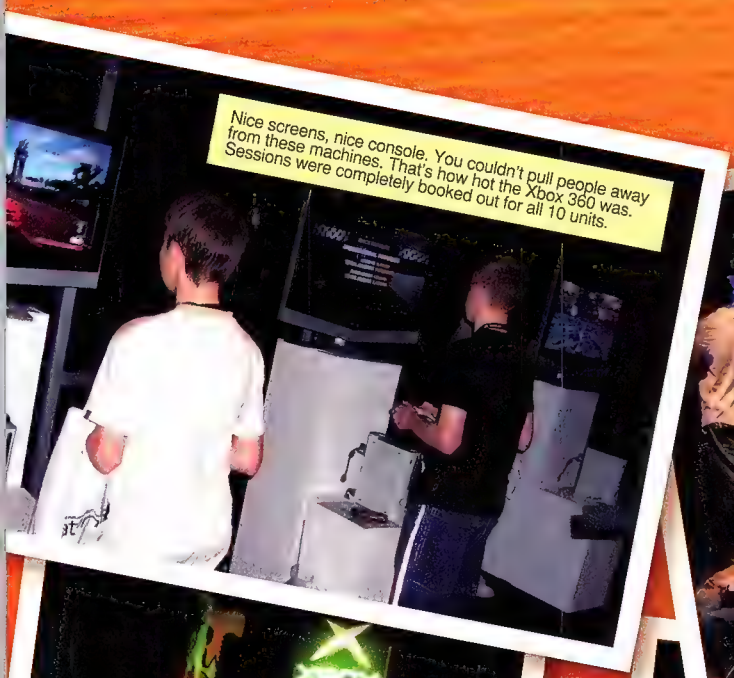


Nick Segger from Xbox presents the Xbox 360 prize, along with two strapping ladies. Unfortunately, they didn't come with the console.

Everyone's favourite scientist Dr Karl Kruszelnicki announces the winners of the day's prize giveaway. Xboxes, PCs and other hardware was up for grabs.

XBOX LOUNGE

A lounge? Full of Xboxes? With Xbox 360s? Yeah, we got excited too. With the help of Microsoft, a truck, and an army of willing lemmings, we managed to fill a room with these wonderful gaming consoles. Attendees had a chance to play with MS's next-gen Xbox 360 and witness it in all its graphical glory. Midnight GT, GTA: San Andreas, The Warriors and GUN were running on the standard Xboxes. While the 360 was home to Project Gotham, Perfect Dark and Call of Duty 2. Did they look good? Hell yes they did, and the only way you could see it for yourself was by going to Atomic Live 2005. We should probably mention at this point that Atomic Live was the first chance most Australian gamers would of had to check out this beast of a gaming system. Atomic is cool like that, and we give many thanks to Microsoft for, in the words of Jean-Luc Picard, making it so.



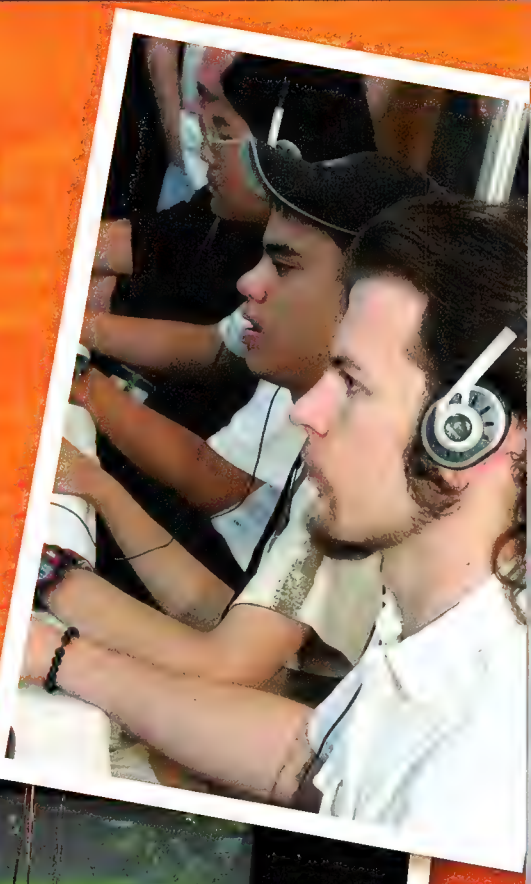
Nice screens, nice console. You couldn't pull people away from these machines. That's how hot the Xbox 360 was. Sessions were completely booked out for all 10 units.

Didn't feel like standing? That's what the bean-bag chair was for. No geek could survive without one and we managed to find one.

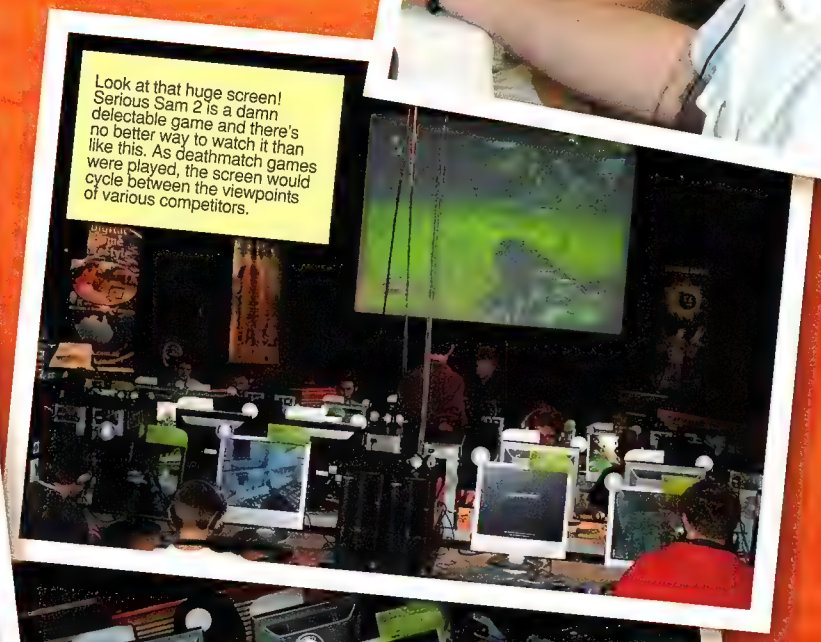
PC GAMING

First off, we have to give massive thanks to 2K Games and 2K Sports for making the PC Gaming area a reality, and BCN Technology for providing 32 uber rigs for attendees to play on. Without either of these two companies, it just would not have been as excellent or as popular as it was. Cheers guys, you are the best.

Now, the action! The 32 PCs were separated into two groups – a 16-player free-for-all running 2K Games' awesome Civilization 4, Vietcong 2 and Serious Sam 2, and a frenetic 16-player deathmatch tournament area for Serious Sam 2. Through a gruelling series of 16 games, where players had to survive the longest in a co-operative arena against hordes of bizarre but deadly creatures, emerged the final group of competitors. The showdown was the ultimate test of first-person skill, patience and tenacity. Congratulations to Lachlan Newman for coming out on top on the day, winning a terrific prize pack from 2K Games consisting of every single game 2K Games releases on every platform in the next year! The PC Gaming area was the highlight of the show – it was a gamer's paradise. Everyone involved had fun, and we can't wait to do it again next year. Thanks to Lambo and Saponification for doing a great job of hosting the proceedings. You guys rock.

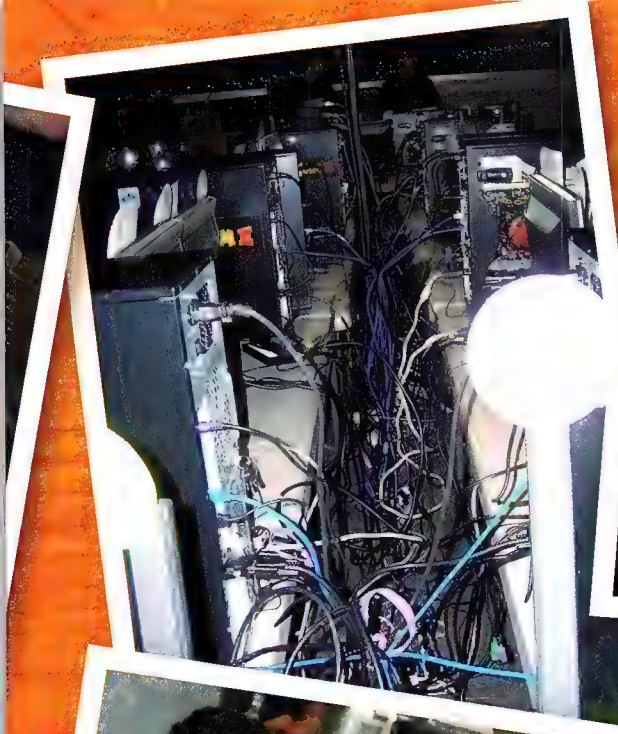


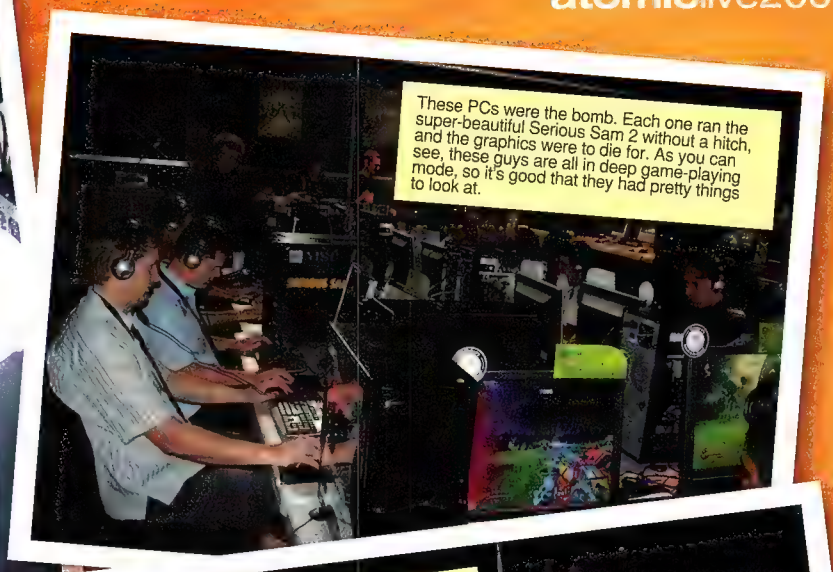
Games are for everyone! Really! This girl surely would have enjoyed a good game of Vietcong 2, Civ 4 or Serious Sam 2. Or maybe she just liked the feel of the mouse.



Look at that huge screen! Serious Sam 2 is a damn delectable game and there's no better way to watch it than like this. As deathmatch games were played, the screen would cycle between the viewpoints of various competitors.

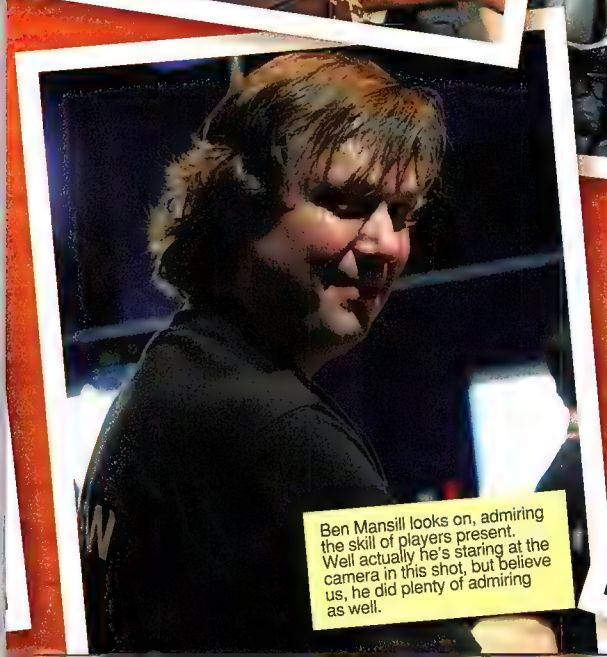
Christopher Taylor, otherwise known as Saponification on the *Atomic* forums, commentates on the Serious Sam 2 deathmatch games. The guy on the left is dual-wielding!



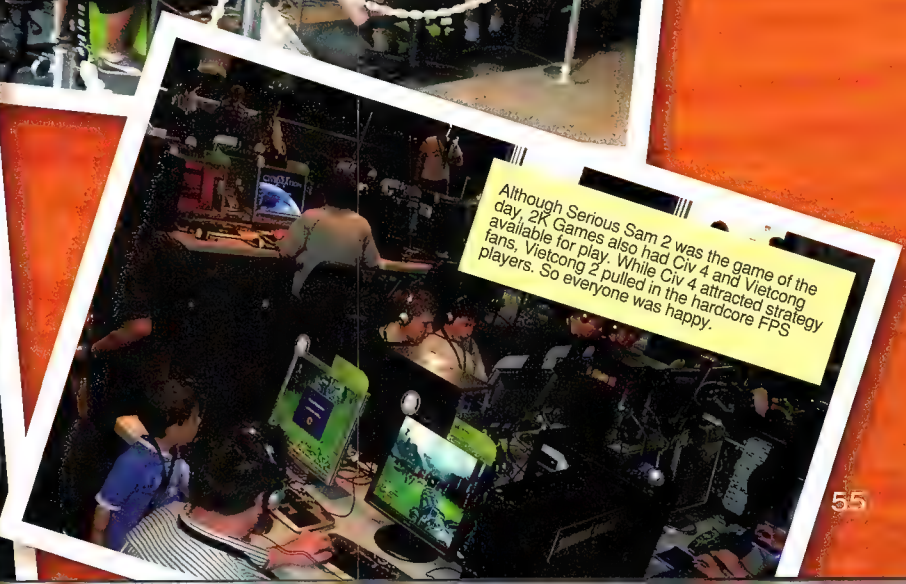


These PCs were the bomb. Each one ran the super-beautiful Serious Sam 2 without a hitch, and the graphics were to die for. As you can see, these guys are all in deep game-playing mode, so it's good that they had pretty things to look at.

Even more gamers concentrating hard on keeping their virtual avatars alive. It's not as easy as one thinks, especially when a gigantic horned beast has nothing better to do than charge at you. It's loads of fun.



Ben Mansill looks on, admiring the skill of players present. Well actually he's staring at the camera in this shot, but believe us, he did plenty of admiring as well.



Although Serious Sam 2 was the game of the day, 2K Games also had Civ 4 and Vietcong available for play. While Civ 4 attracted strategy fans, Vietcong 2 pulled in the hardcore FPS players. So everyone was happy.

READER AWARDS

Atomic Live 2005 was followed in the evening by the super awesome *Atomic* Reader Awards 2005, a rather posh and prestigious awards ceremony that recognised the movers and shakers in the industry, as voted by *you*. Everyone was there, from key members of the industry and nominees, through to select readers who won entry to the evening. And they all filled the floor of Studio 11 at The Entertainment Quarter, making it the hippest venue in Australia that night

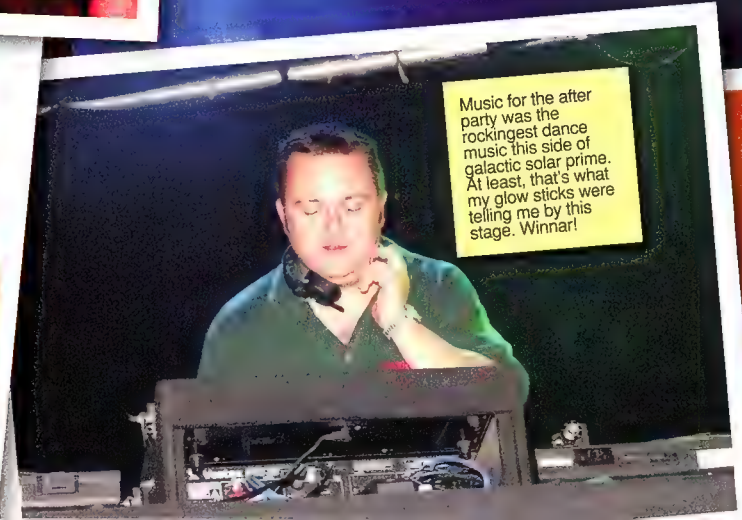
The ceremony itself was a slick showing with Ashton Mills and Dr Karl presenting winners with their awards up on stage, flanked by the *Atomic* Angels. Winners were welcomed in front a gigantic display, shook hands with the famous Dr. Karl, and went away knowing that the Atomic readership had chosen them as the best of the best. It was fantastic, and everyone agreed it was the best awards ceremony the IT industry had ever seen in Australia.

The drinks flowed, dancing ensued, and copious amounts of fun was had by all. We didn't dare show it here, but certain Atomicans even got up on stage and danced the night away in front of the DJ. Yes, geeks *dancing*. So instead, you'll have to deal with photos of a bunch of geeks not dancing (but doing *lots* of other things).

The tag-team effort of Ashton and Dr Karl saw everyone entertained with the odd gaff and witty excessive references to Ali G. Behind them a big screen displayed runners up and winners, while the *Atomic* Angels set tongues a-dangling.

Yar! Atomicans to the rescue! The night wouldn't have been the same without you guys! Left to right: Gramyre, Airswing, Felipe, Logicprobe, Lambo, Salty Peanut and Saponification.

There were 18 awards in all, and each recipient was super happy to win. These guys take the Reader Awards very seriously. See that smile? If you voted in the awards online, you did that!



Music for the after party was the rockingest dance music this side of galactic solar prime. At least, that's what my glow sticks were telling me by this stage. Winnar!


Ashton welcoming everyone to the awards. The similarities to a benevolent dictator are purely coincidental.


The results of a night of hard partying. The man on the right is Neil, and every time your mag arrives late he loves to hear from you!


Everyone got to mingle – industry people, staff, readers and – wassat? – girls! Does it get any better than this?


More than just the next line-up of Manpower, these chaps are loyal Haymarket employees. That man in the middle laid out this very page and is the mastermind behind 'Bill's Reviews!'


Ash has no memory whatsoever of who the chap he's got his arm around is. It might be someone he knows. The memories are all fuzzy.

and the winners are....

GPU manufacturer
NVIDIA
Runner-up: ATI

Video card manufacturer
Powercolour
Runner-up: Gigabyte

CPU manufacturer
AMD
Runner-up: Intel

Motherboard manufacturer
ASUS
Runner-up: Gigabyte

Memory manufacturer
Corsair
Runner-up: Geil

Case manufacturer
Antec
Runner-up: Coolermaster

Cooling product manufacturer
Thermaltake
Runner-up: Zalman

Hard drive manufacturer
Seagate
Runner-up: Western Digital

Audio product manufacturer
Creative
Runner-up: Apple

ISP
iiNet
Runner-up: Internode

Monitor manufacturer
Samsung
Runner-up: Benq

Innovation
Dual core CPUs
Runner-up: Nvidia SLI

PC single-player game
Half-Life 2 (Electronic Arts)
Runner-up: F.E.A.R. (Vivendi Universal Games)

PC multiplayer game
Battlefield 2 (Electronic Arts)
Runner-up: World of Warcraft (Vivendi Universal Games)

Console game
GTA: San Andreas (Take 2 Interactive)
Runner-up: Gran Turismo (Sony Computer Entertainment)

Handheld game
Nintendogs (Nintendo)
Runner-up: Metal Gear Acid (PSP; Konami)

Peripheral manufacturer
Logitech
Runner-up: Microsoft

Wireless product manufacturer
D-Link
Runner-up: Netgear

Notebook manufacturer
Alienware
Runner-up: ASUS

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- 700:1 contrast ratio!
- 11ms response time!
- Designed for Windows Vista (HDCP support)!
- It's W I D E S C R E E N !
- 77% more screen space than a 24" display!
- Games and DVDs never looked so good!

*** See website for details. Only one prize available to win.**

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tinytweaks

I need to PE

So you've done the whole Knoppix thing, and played around with a live distro of Ubuntu – wouldn't it be neat if you could load Windows the same way, straight from CD? Well believe it or not, you can – and providing you have an existing copy of XP/2003, you don't need to buy a special edition from Microsoft to achieve it! Enter Bart's Preinstalled Environment (**www.nu2.nu/pebuilder**) which can copy the data from an existing Windows install disc and set it up as a contained environment, ultimately providing a version of Windows that will boot straight from CD. With a plugin architecture provided, and many support tools available, this package and its add-ons are invaluable to system recovery efforts, not to mention give you *super cool kudos* for de-bulkifying Windows onto a CD.

Parallel zippyness

If you've jumped on the dual-core bandwagon and snapped up an Athlon 64 X2 or Pentium D, and you're already over having ultra-fast compile times, you're probably looking for some shiny new multithreaded apps to show off your pride and joy. One of our favourites is 'pbzip2', a parallel version of bzip2 that scales almost linearly across multiple cores. Install your distribution's libbz2 development package and grab the pbzipi2 source from **compression.ca/pbzip2**. After a quick compile you can use pbzip2 just about anywhere you use bzip2 – it automatically detects your CPUs and splits up tasks as appropriate. It even works for decompression, so now your kernel source downloads will be extracted and ready in no time. If you're a Gentoo user, this has obvious benefits for your next toolchain upgrade and essential **emerge -e world**.

Spray on vinyl

One of the 'boring bits' that can challenge the perfect case mod are those unsightly expansion bay modules that house additional USB/FireWire ports, sound card connectors and the like. It seems that with every passing MoBo generation and on-board capabilities there is a proportional increase in these PCI 'daughter slots'. The wires themselves are easy to mod, with cable sleeving and heat shrink, but what about the modules themselves? Thankfully, salvation is just a spray can of vinyl dye away! Remove the PCI bracket, mask the connectors and internal wiring, and spray them with a complimentary shade for your colour scheme. For preparation, clean the plastic with some turpentine or grease remover, and give the surface several light dust coats as a primer before a final coat.

It's the little things that count

At least, that's what Craig Simms keeps telling himself.

Fundamentally, Windows Explorer as we know it has been with us for over ten years now. Sure, it's had the odd graphical and functional nip and tuck over the years, and Vista promises some interesting – if cut back – revamps. Still, on the whole, things have remained pretty much the same since Windows 95. While complete shell replacements are available (as well as some pretty impressive theming suites) – few match the maturity of the Windows solution. So rather than replacing, let's look at extending and augmenting the Windows shell, with some really neat little programs.

Shell extensions

RegSvrEx

www.mlin.net/misc.shtml

Adds the option to register a .dll or .ocx file from the right click menu in explorer.

Folder Pilot

www.baxbex.com/products.html

This shell extension creates a toolbar in Explorer that displays a navigation 'breadcrumb' system. This system is present in the upcoming Vista and is also employed on several websites, and greatly speeds up the complex navigation process. It also adds an entry to the context menu that allows you to quickly switch to recently accessed folders, or add your own customised entries. Sadly it's a 30 day trial – there aren't any free extensions that exist to duplicate this functionality.

FolderBox

www.baxbex.com/products.html

Allows you to split the Explorer file window in half horizontally, giving another independent file view. You can have five such file views in the one window thanks to the miracles of tabs.

bxNewFolder

www.baxbex.com/products.html

Create a new folder in Explorer just by hitting the F10 key. This is a long needed tool.

ShellExView/ShellMenuView

www.nirsoft.net/utils/shexview.html
www.nirsoft.net/utils/shell_menu_view.html

Displays all the shell extensions/menu items installed on your PC – and if it tickles your fancy it can also disable them if they're causing issues.

AllSnap

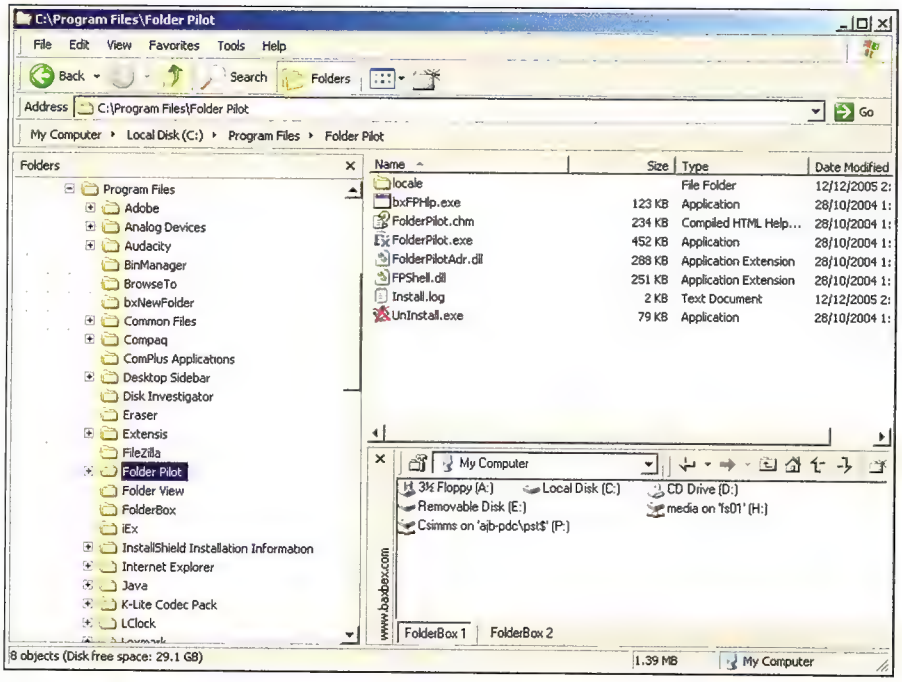
ca.geocities.com/ivanheckman@rogers.com/

A small tool that sits in the system tray and allows all top level windows to "snap" to each other from all directions or the sides of the desktop, within a given pixel tolerance. Also has a toggle key to temporarily disable the snapping, and further advanced options.

Volumouse

www.nirsoft.net/utils/volumouse.html

Set the volume in windows using the scrollwheel on your mouse, either when certain conditions are met, or when a hotkey is held down.



▲ **Folder Pilot adds a breadcrumbing toolbar to Explorer, bxNewFolder a new folder shortcut, and FolderBox a tabbed window view at the bottom.**

Hardlinks/Junction Points

hermann.schinagl.tripod.com/nt/hardlinkshellext/hardlinkshellext.html
www.rekenwonder.com/linkmagic.htm

Hard links are like shortcuts, but rather than just a link, the OS treats all hard links as actual files. This is done by creating multiple file references for just one set of file data – allowing copies to be spread in many locations without increasing the space taken on the hard drive.

Junction points on the other hand work exclusively with folders, and can allow you to remap a folder to another – fooling the computer into showing the contents of one folder whenever you click on another.

Windows XP supports hard links and junction points just like Unix, but it's not accessible by default. These extensions open up that functionality.

FolderSize

foldersize.sourceforge.net

Lets you display folder size as a column in Windows Explorer.

ExecPar

www.mainsoft.fr/en/downloads.htm

Right click on an executable, choose "Execute with parameters" and a message box will appear, allowing you to enter any arguments you like. Quicker and easier than using the command prompt.

ClipName

www.mainsoft.fr/en/downloads.htm

Creates a nested option in the context menu that can copy file/folder names and paths to the clipboard, with support for DOS and URL pathnames, multiple files and delineation by CRLF or space.

PowerMenu

www.veridicus.com/tummy/programming/powermenu

PowerMenu adds "Always On Top", "Minimize To Tray", "Priority" and "Transparency" items to the menu when you right click on an application in the task bar, and also when you left click on the top left icon.

MinMaxExtender

www.monctoncomputerservice.com/revenger_inc/download.html

Adds up to six buttons to the title bar, that enable maximising horizontally and vertically, hiding the application, shade mode, minimising to tray and pinning on top.

Fast Explorer

thesoftpro.tripod.com/downloads/fe/index.htm

Add your own right click menu items with ease. Also contains a shell extension cleanup util.

Shell Renamer

www.codeproject.com/shell/shswapl.asp

Adds regular expression renaming to Windows Explorer, following the egreps pattern matching. To install, drop into your Windows\system32 dir, open a command prompt and type regsvr32 shswap.dll. Or register using the RegSvrEx extension above J.

Hotkey Plus 1.00

www.brianapps.net/hotkeyplus

Lets you define hotkeys for loading applications. Make the Windows key useful! Also bundled with a program that will set window sizes to a fixed res – bind a key to this for quick resizing.

PlacesBar Editor

www.maddogsw.com/placesbar

Allows you to add your own entries to the places bar on the common open/save file dialogs.

HawkEye ShellInit

www.hawkeyetech.com/products/freeware.htm

With this scriptable tool you can set margins around your desktop that maximised windows can not expand beyond. Useful if you always want an IM client or something similar open.

Vebwiev

vebwiev.tripod.com/

Custom webview tool for Explorer, allowing you to preview audio/video files like the good old Win2k days, as well as see all types of extra information. If you possess some scripting skills, you can also sort through the source to customise your own. Make sure to read the FAQ, because it's certainly not a point and shoot app.

IESHWIZ

windowsxp.mvps.org/Customize_folder.htm

An old Windows tool, allows you to add an image to the background of your folders.

BrowseTo

www.straightnochaser.org/goodies/aboutbrowseto.html

Adds an option in Internet Explorer to browse to any selected plain text links.

Wildcard Select

www.codeproject.com/shell/wildcardselect.asp

Right click in an Explorer window, choose Select, and you can then select any files within that window that adhere to a particular filemask.

Powershell XP

www.jastek.net

Although these can be added through registry hacks, this install adds a whole bunch of options quickly to the right click menu of the My Computer icon, including options to shut down your computer, access computer management and the registry.

LClock

fileforum.betanews.com/detail/1092761816/1

The Longhorn system clock, which replaces the task bar clock. Based off the look of early Windows Vista builds, features a fancy look and pop up events calendar.

GetFileSize

www.browsertools.net/Get-File-Size/index.html

Gets the file size from a URL, so you know what you're downloading. Can be integrated into Internet Explorer.

Virtual Desktop Manager

www.microsoft.com/windowsxp/downloads/powertoys/xppowertoys.mspx

Add three extra 'virtual' desktops to your system, accessible from the task bar.

TweakUI

www.microsoft.com/windowsxp/downloads/powertoys/xppowertoys.mspx

Not an extension per se, but definitely worth mentioning due to the myriad of shell tweaks it allows, as well as easy access to things usually requiring the registry. A must have.

Desktop enhancements

Object Dock

www.stardock.com/products/objectdock

Like the Apple OSX dock, this is a quick reference bar for applications, featuring all manner of cool zoomy icons, which may actually irritate some - lucky you can adjust how much things bounce around, or just turn it off altogether. Almost a start bar replacement, but if you're into this kind of thing works well.

Desktop Sidebar

www.desktopsidebar.com

Adds a Vista style sidebar to your desktop, giving access to your quick launch bar, news, stock quotes, system stats, weather, slideshows and more.

Rainlendar

www.ipi.fi/~rainy/index.php?pn=projects&project=rainlendar

Is a calendar, to do list and event management tool that sits on your desktop. It can set an alarm for a customised amount of time before an event happens, and access Outlook's appointment schedule. Better than dealing with annoying post-it notes style programs, although you'll have to delve into the ini files to set the width of the notice boxes. A server version is also available, meaning that you can synchronise events between clients – although this is not secure and everything is sent in plain text, so take appropriate precautions.

Samurize

www.samurize.com

The ultimate desktop modder's tool. Samurize lets you script away to your perfect desktop, revealing all sorts of interesting stats all the way to the current weather, neatly sitting on your desktop.

Konfabulator

www.konfabulator.com/

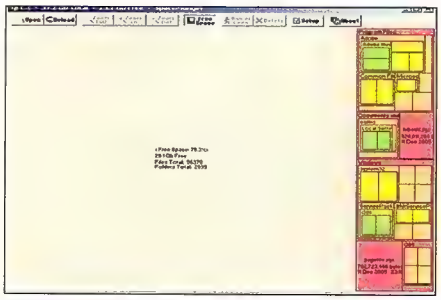
Recently bought by Yahoo, Konfabulator adds configurable modules, or 'widgets' to your desktop. Useful for some, annoying for others – worth checking out all the same.

Useful apps

SpaceMonger

www.werkema.com/software/spacemonger.html

Graphically represents how much space folders and files on your drives are taking up, dynamically readjusting to the resolution of your screen to add in as much detail as possible. Useful for hunting down forgotten stuff!



Eraser

sourceforge.net/projects/eraser

Will nuke files beyond retrieval, if you're overly security inclined.

Locate32

locate32.webhop.org

Keeps a database of all local files for an insanely fast search.

RefreshLock

www.pagehosting.co.uk/rl

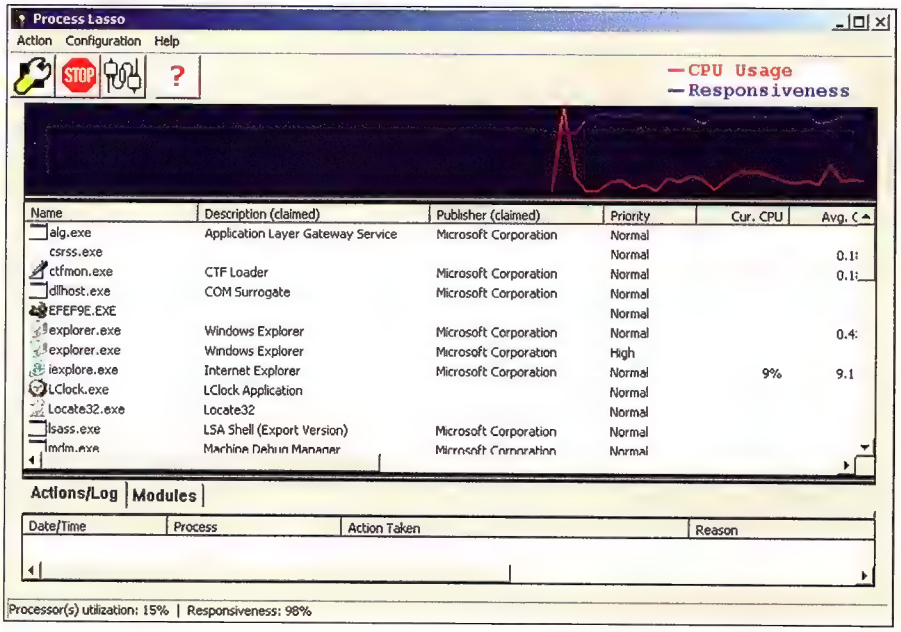
If you're on a CRT and are still having problems with games dumping back to 60Hz refresh, use this tool to force the refresh rate of your choice. Or just upgrade to a TFT already!

Process Lasso

www.bitsum.com/prosuper.asp

Measures when a process is using above a certain amount of CPU usage, then will forcefully throttle it back or kill the application if need be. Can also terminate any specifically named processes that attempt to boot (great for removing spyware), and alter any named processes at runtime to a priority that you prefer.

So there it is – a collection of small tools that should make navigating Windows a little more pleasant. Take care though, as obviously the more stuff you install, the bigger the load on your machine will be, and therefore the slower it will run. As always when tweaking – the key is balance.



▲ **Process Lasso is a great way of getting rid of Spyware.**

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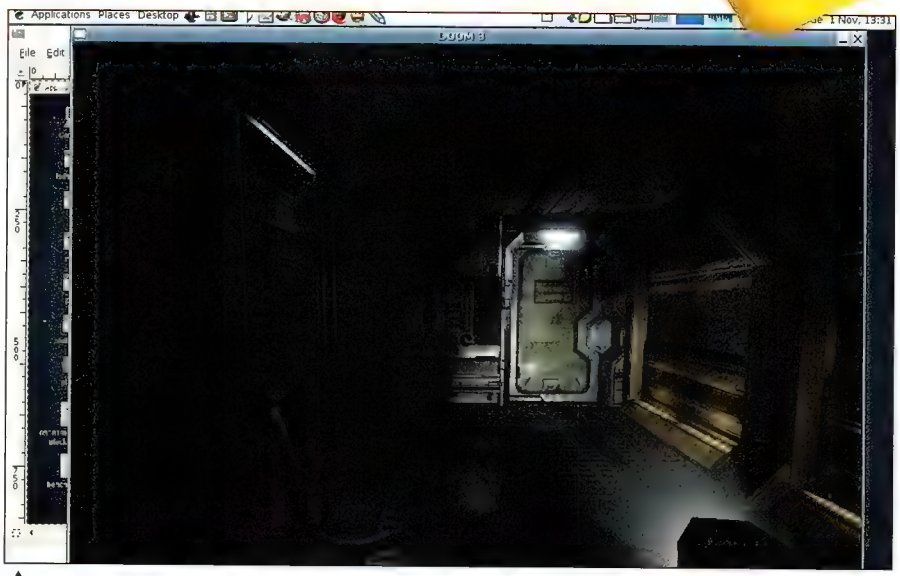
Get your game on

Leigh Dyer does the impossible – gaming on Linux. Grab a distro and start playing!

Hopefully after last month's look at all things 3D video under Linux, your PC is fired up and ready to roll with some hardcore pixel-on-pixel gaming action. Linux gaming used to be a bit of a misnomer, but thanks to the efforts of companies like Loki, id, Epic and the countless thousands of hours put in to development work by the open source community, Linux has a surprisingly solid set of native commercial and open-source games.

A Linux port's anatomy

Quite a few commercial games have come to Linux in one way or another, usually through downloadable binaries that work with the content from the Windows version of the game. Just about all of id's games, and all of Epic's Unreal Tournament games, have been ported this way, as have a few other titles like



▲ **Doom 3 running in a window, just so you can see the OS underneath it.**

Joysticks and Linux

Beyond the good old fashioned FPS, most games play best when you have some kind of analog joystick or gamepad plugged into your PC. Linux supports most kinds of controllers connected through USB or traditional gameports, and even a few oddities like old SNES and Playstation controllers hooked up through home-made parallel port connectors. USB controllers are the easiest option though: here's how to get one working:

1. Install the joystick helper tools, **jscal** and **jstest**; in Debian, they're in the 'joystick' package.

2. Plug the controller in and check your 'dmesg' output to see if it's been found. You should see a message like this:

input: USB HID v1.10 Joystick [Logitech WingMan Action Pad] on usb-0000:00:10.2-1

3. You should now find a device for the controller at '/dev/input/js0'. If it's not there, you probably need to insert the 'joydev' module (with the **sudo modprobe joydev** command), as some distros don't do this automatically:

4. Test your controller by running **jstest /dev/input/js0**. The output should list the current values for each detected axis and button, changing the displayed value as you test each of them. Each axis should display a full range of values from -32767 to 32767. If they don't (usually on joysticks, rather than gamepads), you'll have to calibrate your controller.

5. To calibrate your controller, run **jscal -c /dev/input/js0** and follow the prompts, moving each axis through its full range of motion. Once it's done, run jstest again and make sure each axis is working as it should.

6. Calibration settings aren't persistent, but you can save them and restore them later. Run **jstest -p /dev/input/js0** to print a jscal command that will restore your calibration settings; save this somewhere and you can run it later as needed. Alternatively, put that command into your desktop or OS startup scripts if you'll be using your controller regularly.

Neverwinter Nights and Savage. Some older games are now available in a similar manner thanks to their developer's open-sourcing the engine, and hackers putting together a Linux port; Volition's Freespace 2 is a good example.

Some companies have tried to produce boxed Linux ports available alongside Windows and Mac versions at retailers, but this has so far met with limited success. Loki Software ported a number of games before the declared bankruptcy, and you can sometimes see these titles on eBay. Linux Game Publishing is doing similar work on a smaller scale, and seems to be doing well so far.

The commercial titles are all a bit of a no-brainer though – you know you want to play them, and it's usually just a matter of getting a copy of the binaries and installing using your original CDs. There's a lot of interesting work happening in the open-source gaming world though, with all sorts of ambitious new game projects appearing. We've come a long way from Tux Racer and Freeciv...

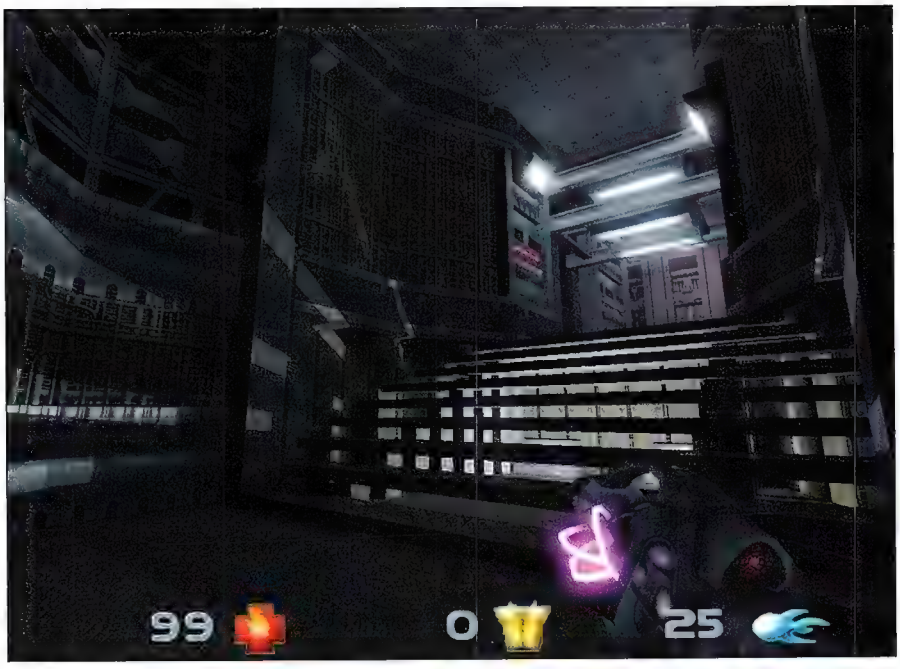
▲ **Torcs doesn't look fantastic, but it's good fun to play.**

Nexuiz

Nexuiz (**www.nexuiz.com**) is a very neat multiplayer FPS with some quite impressive graphics. The engine, called Dark Places, handles real-time dynamic lighting and shadows, bloom effects, and all manner of GL 2.0 shaders, so it's a little surprising to find that it's actually based on the Quake 1 engine. You can use Dark Places itself to play through Quake 1 with these new features, but the Nexuiz developers have built on the engine and replaced every drop of content to create an entirely new game.

Getting started with Nexuiz is pretty easy: just choose a game mode and a map and jump in. It's best played online or on a LAN with some human opponents, but the newest versions have bots as well for the social pariahs among us. There's a good selection of game modes on offer, with CTF, Domination and its own Runematch along with the usual deathmatch and team DM. The levels tend to have a dark, industrial look to them, and with all the effects turned on they really do look quite nice, though the engine's not as optimised as most newer commercial engines; expect low frame-rates with everything turned on unless you've got one hell of a PC.

▲ **There's a variety of game modes on hand, including CTF.**



▲ **The Quake 1-derived engine in Nexuiz brings the shiny in impressive quantities.**

Torcs and VDrift

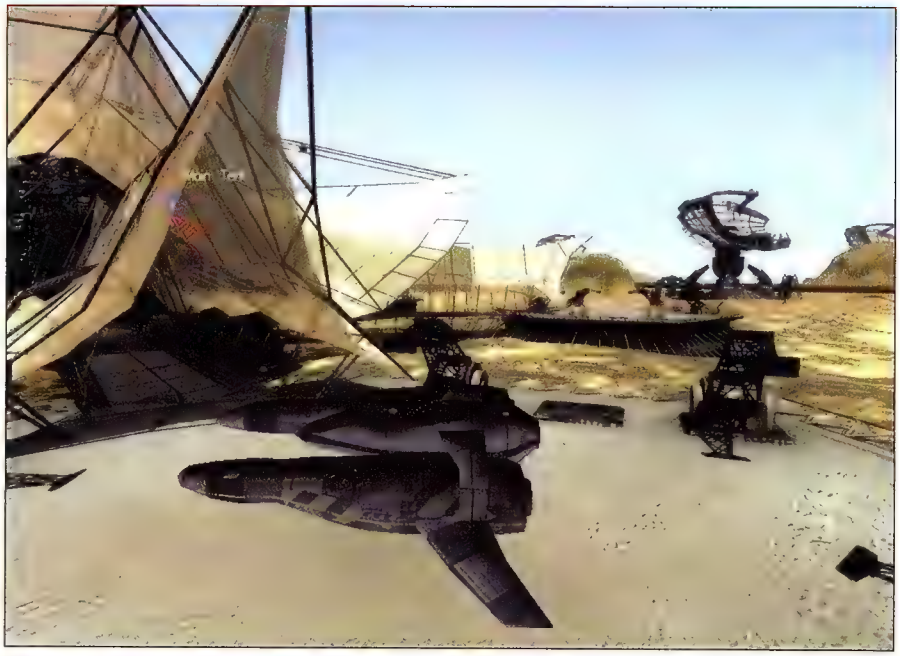
If you're looking for a fun arcade-style racing game, you could do far worse than to check out Torcs (**torcs.sf.net**). It's quite a solid racer, with game modes running from single races through to various championships, both AI opponents and network multiplayer modes, and an emphasis on easy pick-up-and-play fun. In fact, when driving around it feels quite a bit like good old Daytona. Unfortunately, the graphics look like they're from about the same era; track-side objects and the cars themselves are typically quite simple models with basic (and almost crayon-coloured) textures applied.

▲ **VDrift: where nothing's as much fun as stalling your car.**

If you can look past the graphical shortcomings, take Torcs for a spin and see how you go. Otherwise, you'll have to wait for version 1.3, now in development, which looks set to have much nicer track and car models and an improved (though still arcade-style) physics model.

For those with a lust for the kind of realism usually associated with games like Gran Turismo 4, there's a newer game called VDrift (**vdrift.net**) which focuses on having an accurate physics model. It looks a lot nicer than Torcs too, with a more modern (and demanding) engine that renders some nice generated foliage and shiny, detailed car models. The physics engine is really where it's at though, and if you haven't played a realistic driving game before, you're in for a shock; just keeping the car running, let alone going in a straight line, can take some effort.

It doesn't yet have the AI and gameplay modes of Torcs, but with its realism there's a lot of fun to be had just cruising around, feeling your way through the bends and working out just where the handling limits of your car lie.



▲ **The artwork in some of the docked scenes is really quite nice.**

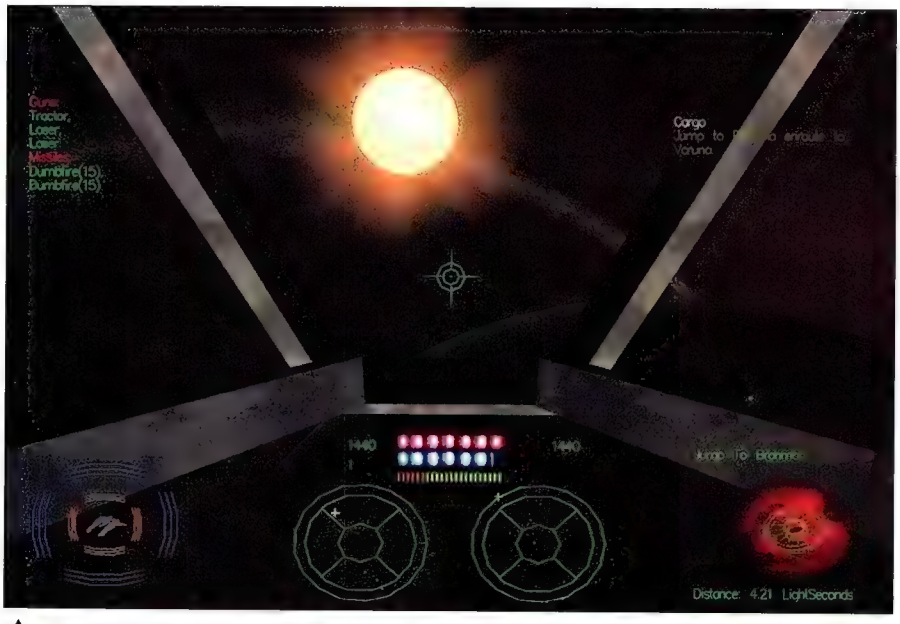
Vega Strike

Vega Strike (**vegastrike.sf.net**) is a game that we've long kept an eye on due to our teenage obsession with a little game called Frontier: Elite 2, an open-ended space sim that deposits you in a sci-fi universe with a mediocre starship, a handful of credits, and the opportunity to do basically whatever you like. Vega Strike gives you much the same freedom, though with much better presentation thanks to a nice 3D engine.

The gameplay on hand is remarkably varied; players typically start by running a few safe trade routes, but as your cash reserves grow you can buy bigger ships to ferry more cargo, or branch out in to more risky fields like smuggling, bounty hunting, or military work.

When you're not docked at a space-port, taking on cargo or applying for other jobs through an adventure game-like interface, you'll be sitting in your cockpit, flying between planets and systems. Combat plays an important part of the game, even if you're just running cargo, since space pirates are abound, ready to destroy your ship and claim your cargo. Shipyards at the various space-ports offer a hefty range of upgrades, particularly in weapons and defensive systems.

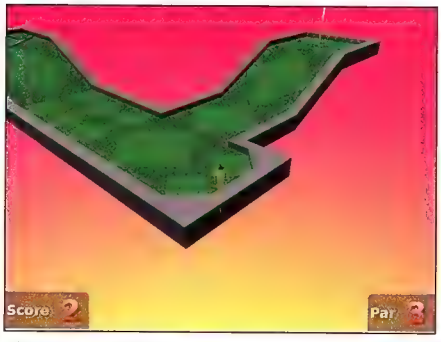
There are a few rough edges as you'd expect, but on the whole Vega Strike is surprisingly well developed. The universe is dynamic, with the various factions often redrawing their borders due to conflicts. Your relationships with the factions are much the same, as the missions you choose make you both friends and enemies. There's also some scripted content in there, introduced through characters in the bars at various outposts, but it's the generated content that you'll be spending most of your time playing through.



▲ **Vega Strike is an impressive open-ended space sim in the tradition of Elite.**

Neverball

Neverball (**icculus.org/neverball**) is another firm favourite, perfect for quick pick-up-and-play sessions. It's a frustrating, but quite addictive, action puzzle game based heavily



▲ **Neverball captures the fun and devil-spawned frustration of Super Monkey Ball.**

▲ You can make up your own joke about balls here.

on Sega's Super Monkey Ball. The objective is simple enough: roll a ball from one end of the level to the other by tilting the world, using gravity to move the ball, though once you get past the first few levels you'll see just how evil this game can be. As well as the standard mode there's Neverputt, a multiplayer mini-golf game based on the Neverball engine, much like the Monkey Golf game in Super Monkey Ball.

You can use the keyboard, but you'd be crazy to – this game absolutely demands analog controls. The mouse works well enough in a pinch, but a gamepad is ideal. To turn on joystick support, you'll have to edit your ~/.neverball/neverballrc file and change the value of the 'joystick' to 1. You can change the joystick device number to use and the axis and button layouts as well, though for a standard setup with a single device you should be fine.

Time wasters ahoy

We've tried to showcase some of the more ambitious open-source game projects here, but there's a bunch of small, simple games out there that are great fun too:

Crack Attack

aluminumangel.org/attack

▲ Don't put this on your laptop for your partner. Trust me.

A puzzle game based on Nintendo's Tetris Attack. The graphics and gameplay are simple, but it's so criminally addictive that you won't care; don't start playing this when you have something more important to do. Use the cursor keys and space bar to shuffle the blocks around, lining up three or more of the same colour to make them disappear.

▲ Frozen Bubbles looks and feels great despite being written in Perl.

Frozen Bubble

www.frozen-bubble.org

A fun clone of Taito's Puzzle Bobble that's very polished, with great graphics, sound, and music, and the dubious honour of being written entirely in Perl (though we don't hold that against it). Shoot the coloured balls in to groups of three to clear the board.

Kolf

www.kde.org

One of the games packaged with KDE, Kolf seems to be slowly taking over as the default timewaster of choice for Linux geeks. It's a simple 2D mini-golf game that's easy to pick up but infuriating enough to keep you playing. There's a built-in course editor and even a plug-in system for developers.

The mineral oil PC, Part 2

Ron Prouse dips his hands into the world of oily cooling in this final installment.

One of the great things about building this box has been the reaction of people who walked into the workshop during the testing phase of the finished unit. The standard reaction has been a few seconds of stunned silence, followed by the two obvious questions, 'Does it actually work?' and 'Why?' This was reminiscent of the attitude toward our early water-cooling experiments back in the late 1990s.

Part one of this tutorial concluded with a large acrylic box sitting on top of a tank stand – looking somewhat complete, but in reality it had a long way to go, especially as we were trying to create a finished product that could be used regularly rather than just a quick photo-shoot 'gimmick' machine. So now here it is, part 2 of the Oil PC project, where we not only finish building the box, but we pour in the oil, turn it on, and watch the fun!

Suppliers

PC Case Gear **www.pccasegear.com**

- Thermaltake Tower 112 heatsink, fan not included. $58.00
- Zalman ZM-NB47J chipset cooler. $11.00
- G.Skill 2-3-3-6 Series Dual Channel Edition PC-3200. $169.00
- Lazer LED 6 spotlights. $11.00 each
- Techflex 6/11mm cable sleeving. $3.30 p/metre

The rest of the system was bolted together out of components that were lying around the Atomic Labs, nothing too spectacular, but included a Winfast K7NCR18D Pro motherboard, an AMD XP2700+ Thoroughbred, and a 64MB MSI MX440-TD8X video card.

Oils ain't oils

The choice of the cashed-up uber-modder would probably be a 3M product called Flourinert, a family of perfluorinated liquids offering unique properties ideally suited to heat transfer and other specialised applications. Flourinert has high dielectric strength, is non-flammable, non-corrosive, has low toxicity and is compatible with super-cooling environments. It also costs over $100 a litre!

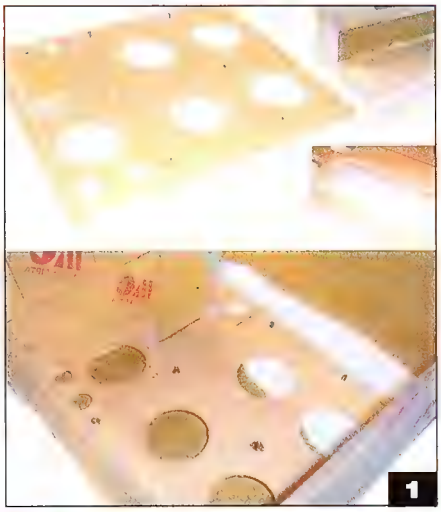
For those of us on a tighter budget the choices are more mundane, and will most likely be either mineral or vegetable oil. As the name suggests, vegetable oil is extracted from plants or seeds, and includes variants such as grapeseed, olive and canola. Mineral oils are usually highly refined products of the same crude oil that we run and lubricate our cars on, and include diesel fuel and the white (paraffin) oil that we have used here. The big question is: Which type is the best for this type of use?

Vegetable oils are much cheaper to buy, and in general have a high viscosity index, indicating that their viscosity does not vary with temperature as much as mineral oil. Due to oxidation, vegetable oil will break down and decompose (meaning rot!), especially in a warm environment. Several people who have used canola and olive oil for this type of use informed us that in the longer term the tank will become infested with algae, form a sludge and start to stink. Really stink! So vegetable oils are a high maintenance option.

Mineral oils, on the other hand, are highly refined lubricant stock used for specialty applications such as cosmetics and medicines that will last much longer, and only need to be replaced when they become contaminated with excessive dust, cola beverages or moisture. The other, aesthetic advantage of mineral oils is that they are quite clear in colour, as opposed to the 'yellow' appearance of most vegetable oils.

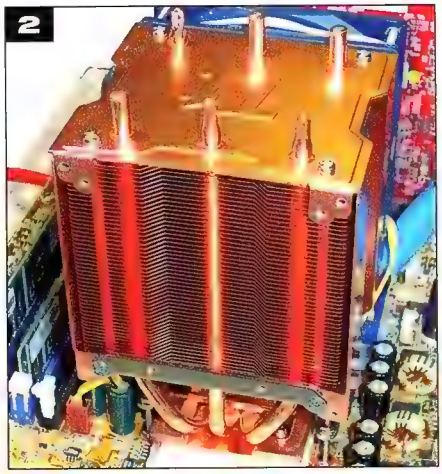
What about their ability to be super-cooled? Vegetable oil consists of molecules in long chains, called lipids, usually with a mixture of molecules of different sizes and shapes. That makes it hard for the oil to form a regular crystal, suppressing freezing over the short-term, however they will turn relatively solid at sustained temperatures around the -30°C mark.

It is widely accepted that white mineral oils have a 'gel-point' of -70°, so it is the better option for an extreme cooling environment.

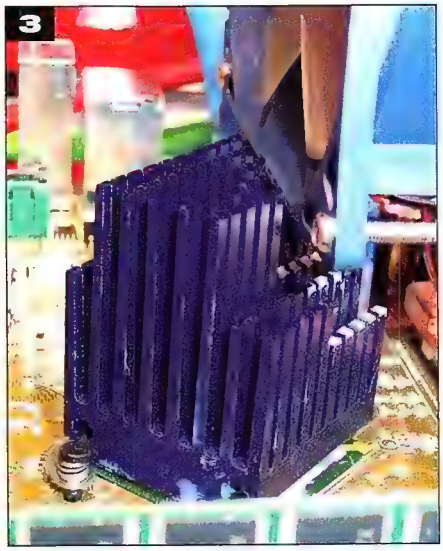


To make assembly and removal of the PC components a simple task, a separate motherboard tray was constructed to secure everything in place, including the power supply unit (PSU). A section of 3mm-thick acrylic sheet was cut so that it was 10mm smaller all round than the tank base, and several 80mm and 30mm diameter drain-holes drilled so that the oil will flow easily down past the motherboard and tray, and pass through the drain hole at the bottom of the tank. The tray was then drilled and tapped to accept standard brass motherboard stand-offs to secure the motherboard. To further assist the flow of oil, the motherboard tray had several 10mm spacers glued to its base so that the bottom of the assembly sat well above the tank floor. Three 10mm-thick pieces of acrylic were cut and laminated together to accommodate the PSU positioning, and then screwed and glued into place using IPS Weld-on #3 acrylic cement. To ensure that the glue bonds properly, all of the contact surfaces were roughed-up with 240-grit sandpaper.

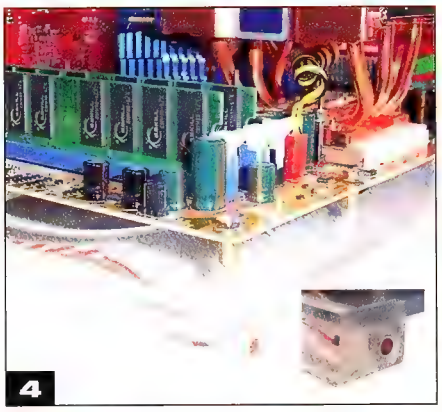
The next step was to fit the Athlon XP 2700+ CPU and the enormous Thermaltake Tower 112 heatsink. This heatsink was chosen as the six heatpipes and 59 60 x 60mm fins give the CPU an incredible 4248cm^2 of surface area, which should provide excellent thermal connectivity between the CPU and the oil. Arctic Silver 5 thermal compound was used to ensure a good thermal hook-up. During assembly a 92mm adjustable fan was fitted to help circulate the oil between the fins, however this proved to be pointless in final testing as the fan would only turn at two revolutions per minute when immersed.



Cooling for the northbridge controller was also improved with the addition of a Zalman ZM-NB47J chipset cooler – again, the idea was to maximise the amount of transfer area between the chipset and the oil. The only issue here was that the large footprint of the Tower 112 HSF overlapped the northbridge area, making some modification of the Zalman necessary – 11 of the heatsink fingers were cut down with a Dremel to gain the clearance needed for component assembly. As well as the supplied brackets and push-pins, Arctic Silver thermal epoxy was used to glue the heatsink into place.



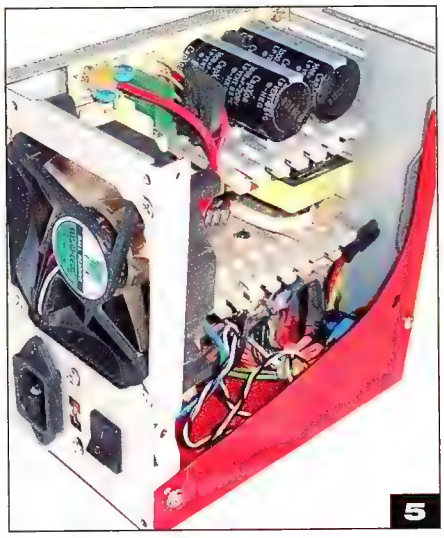
With the PC assembled, it was fitted to the removable motherboard tray and commissioned – it made sense to get the computer up and running while it was still dry, rather than to try and troubleshoot any build issues once it was floating. An LED was wired to indicate hard drive activity and mounted into a small plastic block. This was glued to the bottom of the MoBo tray, facing toward the front of the tank. We decided that a power indicator was overkill, as it is pretty obvious that the PC is on when the pump is circulating oil.

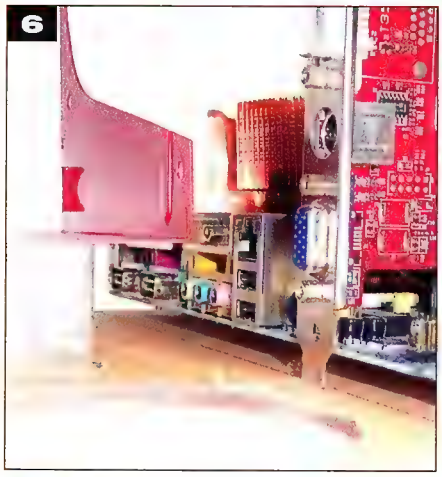


The next item to receive attention was the PSU. It needs to be stated up-front that playing with high voltage components has a degree of risk attached, and that it is possible to electrocute yourself if you do not know what your are doing. This tutorial does not pretend to delve into the safety precautions that should be taken, and therefore it is up to the modder to educate themselves and take care, or to have this component prepared by a licensed electrician.

We used a 465W Super Flower PSU to ensure that there was plenty of 12V capacity to drive the pump and peltier, which later turned out to be less than helpful to the overall efficiency of the cooling system. To get a good flow of oil to run over the PSU heat sinks and capacitors, the side was cut out and any unnecessary wiring removed. At this point the fan was left intact but, just like the CPU HSF, it proved ineffective once the oil was added.

The PSU was the first component to be tested when immersed in oil. Although pure science and urban myth supported the concept of 240V being safe in this environment, it is another thing to actually try it out at home. We can now state categorically that it works!





When the mobo tray was fabricated, a 30mm-high pedestal was included for the placement of the PSU – the reason for this will now be more obvious. Getting the 'footprint' of the PC down to its most useable size meant that the PSU needed to be fitted on its edge, right alongside the IO panel – however that meant that there was little room to connect peripheral cables. This issue was overcome by placing the PSU slightly higher than the MoBo.

At this point all of the wiring was installed and secured to the MoBo tray to stop it from floating around. Three 1.8-metre extension cables were used for the PS2 mouse/keyboard and the VGA-out. The existing PSU cables were extended to reach the hard and optical drives, and a dedicated 12V rail connected to the bottom section of the stand. All of the power wiring was mesh-sleeved for the sake of neatness. An off/on switch was fitted to the inside of the tank next to the remote CMOS reset, and a 16mm hole drilled through the lid for finger access. The peripheral wiring was passed out through the slots in the rear of the lid, and the wiring cable-tied together.

The final step of construction was to add more lights – two Lazer LED 6 Spotlights were mounted on either side of the tank, with the beams aligned so that they converged on the point where the oil enters through the lid. The mounting plates were fabricated from 10mm acrylic and glued into place, and the wires cables-sleeved. As they have very low power consumption, the LEDs have been driven off of the motherboard fan headers.

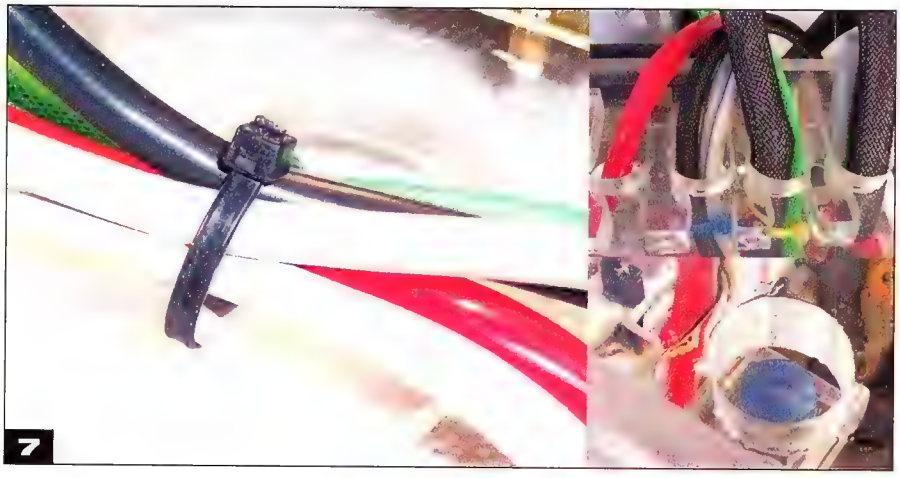
Time to fill it up with oil and see how it performs! The system holds 35 litres of Castrol 15BP in total, which adds nearly 40kg of weight to the structure. At approximately 55kg in total, this is not your normal LAN box, unless you possess superhuman strength.

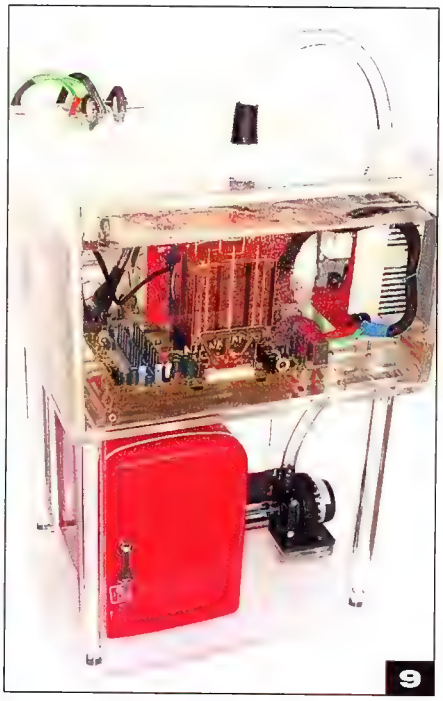
Once it was powered up, the first noticeable thing was the lack of noise; just the faint click of the hard drive spinning-up, and then total silence. With the refrigerator turned on, the fan on the Peltier adds a slight whir to the equation, but overall it is still incredibly quiet.

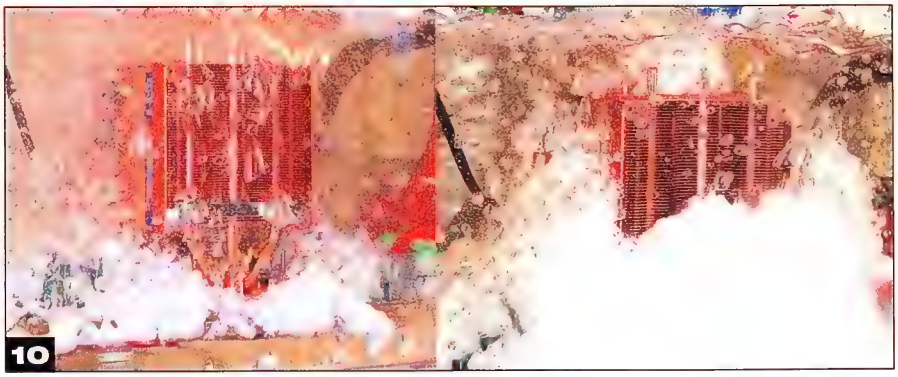
The next step was to run some benchmark loops, and take some temperature readings. Initially we left the BIOS settings at the stock settings, 166MHz Front Side Bus (FSB), 13x multiplier for 2.17GHz. After 40 minutes the oil temperature had risen from the 23°C ambient that it had started at, to a relatively warm 45°C. Slightly disappointed with this result, the decision was made to push ahead with some overclocking, just to see how that affected the temps. The limitation for this machine came up fairly quickly, with an FSB of 174MHz, 2.8V RAM, 14.5x multiplier and 1.80V core voltage for 2.51GHz, but this came at the expense of pushing the oil temp up to 53°C. From another perspective, that is 30°C above ambient air temperature. At this point the PC was left running a synthetic burn-in program from SiSoft Sandra overnight, just to see what the temperatures would be under a sustained load. We were a little happier when we found that it had reached a plateau of 54°c. This was not a major concern from a functionality perspective, as the system was running as stable as a rock. However it was not the result that we had been planning on.

Where is all of the heat coming from? The PSU.

We had placed an 80W Peltier in the cooling loop to help remove the heat build up from the CPU and GPU, but the PSU was releasing almost double that amount of heat on its own, and the tank was not as good at dispersing heat as we thought it would be. After trying several adjustments to the pump speed – slowing the flow rate so that the oil spent more time in the refrigerator was one dud theory – and increasing the liquid volume in the tank, we came to the realisation that this was going to be the best result that we could expect. That is, unless we went one step further...







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11

So, a little further we went. A quick trip to BOC Gas and Gear, and $28.00 later, we had an Esky with four kilograms of frozen CO^2 pellets (otherwise known as *dry ice*) and we were ready to begin super-cooling this PC.

Now, before you start wondering about what the conductive effect of 'ice' in the oil will be, let us re-visit Chemistry 101. As mentioned, dry ice is actually frozen carbon dioxide gas, and does not enter into a liquid state. Rather, it sublimes directly back into a gas. Being dielectric, dry ice won't compromise the rig's electrical conductivity. So, in theory, it won't leave any undesirable by-products behind to change the properties of the oil.

That being said, we were not completely sure of what sort of reaction we were about to unleash, so out came the safety goggles and leather gloves. Lifting the lid, with the PC turned off, in went the first kilogram of pellets ... approximately one litre in volume. The pellets sank straight to the bottom, and started to violently bubble off gas, turning the tank into a churning cauldron of oily excitement.

Almost immediately, the outside of the tank became frosty and the oil in the immediate vicinity of the pellets started to turn into gel. As nothing dramatic had occurred after a few more minutes, in went another two litres of pellets and we fired up the PC. Over the following 10 minutes the area around the CPU, GPU, northbridge and RAM turned into a large block of frozen oil.

Using the maximum stable overclock that we achieved on air-cooling as a starting point, we steadily nudged up the FSB to 183, which combined with a 14.5x multiplier and 1.8V core gave us a resultant clock speed of 2.65GHz. The PC would still boot at slightly higher figures, but it would BSOD as soon as the SiSoft Sandra burn-in program was run.

Using a multimeter probe the ensuing temperature numbers looked like this:

The gelled oil / dry ice block reading was a cool -61°C.

The oil, as it passed through the reservoir, recorded -15°C.

At idle, the CPU plate on the Thermaltake 112 heatsink registered at -9°C.

At this point the outside surface of the tank was covered in a thin layer of ice and condensation, as were the oil pump lines and the reservoir. Normally, the threat of condensation running over electrical components is enough to cause panic, but with the PC wrapped in a cocoon of oil there was nothing to worry about.

After approximately two hours 70% of the dry ice had bubbled its way back into a gas, and by the end of three hours the oil was back at ambient temperature and beginning to rise again. On a restart, the PC was unstable at the higher settings, and had to be reset back to the previous 2.51GHz mark.

Conclusion

So, was all of this worth the effort, just to achieve a clock-speed of 2.65GHz -- representing a mere 20% increase over standard performance?

No, not really.

What did make this project worthwhile was the concept of using an unusual cooling medium, and adapting it into a sustainable, quiet computer solution. Sure, the supercooling possibilities for this type of rig are great, but untenable for anything more than a few hours of fun.

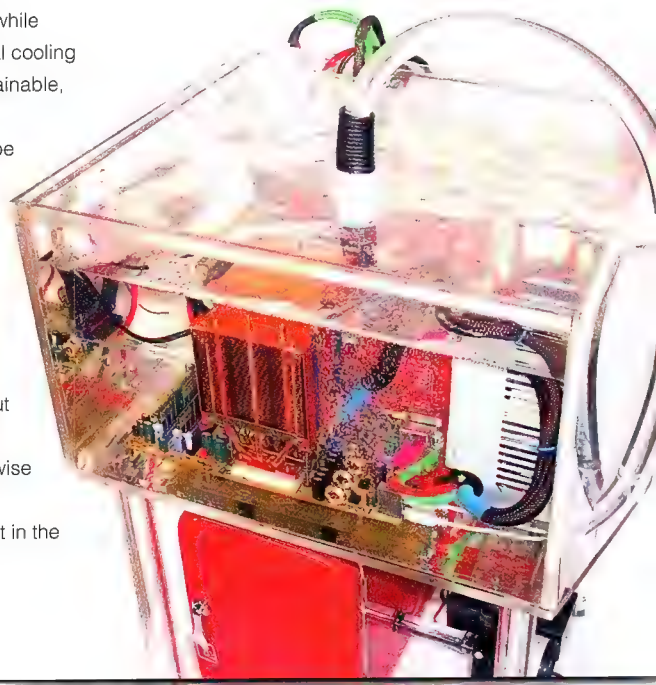
The most likely long-term method of supercooling this particular set-up would be to use a phase-change heat siphon unit, mounted directly into the oil tank, but this would add a level of complexity and additional expense to an otherwise simplistic system.

On reflection, the basic flaw is not in the oil-cooled concept, but in the hardware that we used. If we were going to go down this path again, from scratch, the preference would be to use a micro-ATX board (one which supported a CPU with more headroom), and an external solid-state PSU.

A micro-ATX board could function just as efficiently in a smaller tank, an external 240~12/5V PSU would minimise the amount of heat being transferred into the oil, and this combination would then make the peltier-powered fridge a much more viable cooling solution. The weight reduction of using a smaller tank, and less oil, would also make it easier to move around.

On a positive note, this box is quite happy to run as a fully functional, relatively silent PC, with a performance level equal to a very good air-cooled system. Changing components over is a messy task, but at least your hands are soft and smooth for weeks afterward!

Physically, there can be no argument that the Oil PC exudes a huge amount of charismatic presence in any situation, immediately identifying the owner as one of a more special breed of uber geek – just be prepared to answer the most common FAQ: 'Why?' :)

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gameplay

Games, gaming and gamers covered Atomic-style.

You know the routine – a few times a year a product will come along that you semi-consider sort of seriously. Like the next video card that's 33% faster than the last, or a new CPU that's 10% faster than yours. It's all a bit predictable, and this allows us to moderate our spending. We know what's coming and rarely does something tickle your emotions so much that you reach for the wallet instinctively.

So when the 30" Dell arrived the collective gob smacking here in the office was Tsunamic. Where the hell did this come from? Since when was *any* LCD bigger than 21" on our radar? Well, there's the Dell 2405 I suppose... And – since when was Dell the new cool company?

Crikey, mate. My world has been turned upside-down. Like everyone in the office, within 5 seconds (actually more like 1 second) of seeing this bad boy I was calculating budgets and stuff and planning how I'd rearrange my desk to cope with this beautiful monster of screenage.

First thing we did was fire up Far Cry (we also tried Doom 3, but we have little affection for it and as predicted, bigger Doom 3 does not equal better Doom 3). On the sunny island we were there. All you see is game. Your peripheral vision is nothing but game. We whooped and hollered, we did. We turned out the lights. We called office colleagues: "Labs, now!"

Besides completely filling one's field of view, the really neat thing about gaming on the 30" screen is that everything's about the right size as in real life. Your FPS gun is pretty much the same size as a real gun! That alone makes a world of difference. You're there in the game, holding an M-16 that's life-sized. The game graphic left hand holding the rifle barrel is the same size as your real hand.

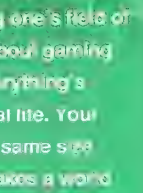
It's this unexpected benefit that made it all so nice. Sure, I'm telling you that 30 is big and big is good, but the bigness brings reality benefits you don't expect until you're playing.

All fired up, the boys went in search of other King Kongesque displays. As it turns out Big is the next Big thing. Samsung sent us a 40" Holy Mother of Freakin' God screen, and there's more coming.

Sure, there are a couple of teensy drawbacks. You'll need SLI 7800s to drive the bitch. 2560 x 1600 native res makes for a hungry baby. And not all games like 16:9, but that's changing quickly. Look at Xbox 360 – widescreen is where it's at.

But damn I love a generational leap. I certainly didn't expect it from Dell but it they can wrangle some Chinese factory into making these things for less than three grand, then I'm sold!

If Ben was Superman, he'd turn back time to save Kong.



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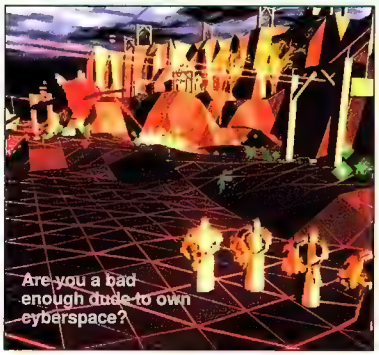


If you've had trouble getting your hands on a copy of Introversion's fantastic Darwinia (reviewed *issue 57*), you can now download it off Steam. It's a measly US$19.95, so there's nothing stopping you. So do your bit for online distribution and grab it now.

Those waiting with bated breath for the Xbox 360 when it arrives on our shores may find themselves waiting with even more bated breath. Currently there are shortages of the next-gen console in both the USA and Europe, and there's not even enough to fill pre-orders. Rest assured, Microsoft is already on the case.

Staying with the Xbox 360, the Register is reporting that a hacker group called 'Pi' has written a utility to dump the contents of 360 discs. Although there are some differences, the format of the discs is essentially the same as the original Xbox.

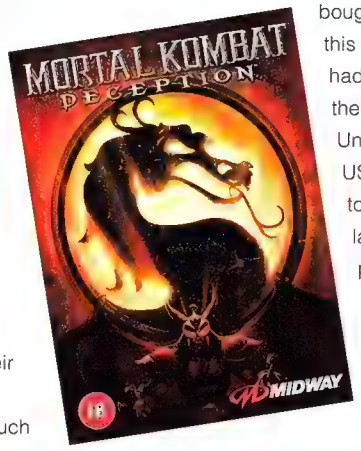
US gaming show G4TV.com has been cancelled after a three-year run. Although there's no news about the website and its future, we can only assume that it will continue running, just minus the TV part.

Scarily, Korean gamers are dying left and right, the latest casuality a 38-year old man from a small town near Seoul. After ten hours of non-stop gaming his body finally decided to give out. Not that we can blame it, but I'm sure he'd have had something to say.

Midway sinks Ratbag

Midway closes down Ratbag Games. Logan Booker cries.

December 13 was the day it all ended for 12-year old Australian developer Ratbag Games and founders Richard Harrison and Greg Siegele, when Midway Games, just a few months after buying the studio, closed down its operations in Adelaide and in San Diego in the US. Ratbag is best known for its excellent racing simulator Powerslide.



Harrison and Siegele spent their lives building up the small independent developer, and created their own technology for their games – no easy feat for such a small studio. However, faced with the poor showing of its last game, Dukes of Hazzard: The Return of General Lee, the future of the developer was bleak.

The closure, which put 70 employees out of work, came as a surprise. Midway bought Ratbag back in August of this year for US$7 million, and even had the company producing under the title Midway Games Australia. Unfortunately, Midway is some US$30 million in debt according to financial statements for its last quarter and it seems at this point Midway is simply cutting its losses.

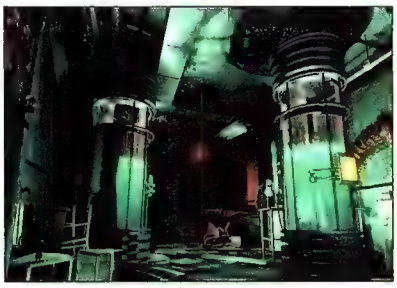
Ratbag dug a niche for itself in the racing simulator market. Instead of developing generic racers, it sought to add flair and innovation to its titles – Powerslide being the best example.

Powerslide – Ratbag's gift to racing sim fans looking for that extra something.

...there are rumours that the game has been picked up by publisher Take 2...

Recently there's been plenty of activity in the Australian developer scene. In the beginning of December, the annual Australian Game Developer Conference was held, and before that, Brisbane-based Pandemic Studios and BioWare joined forces, along with investors Elevation Partners. Irrational down in Canberra has been quiet for some time, but we do know its working on BioShock, the spiritual successor to System Shock 2, and there are rumours that the game has been picked up by publisher Take 2. Of course, this hasn't been confirmed.

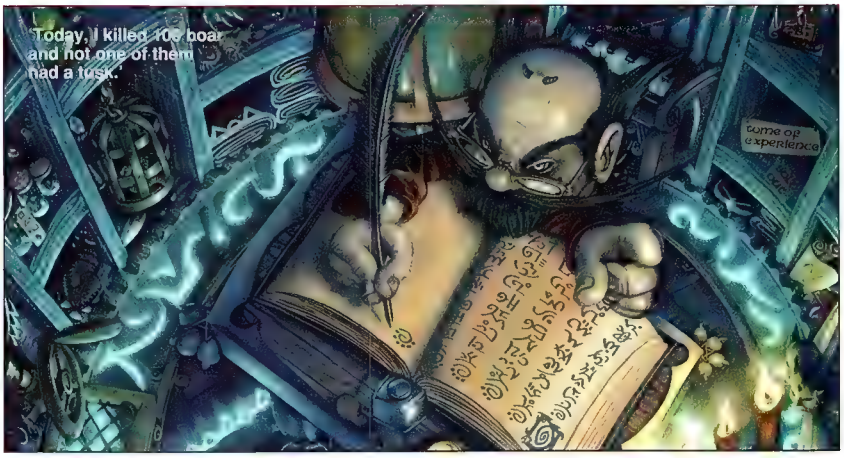
It's sad to see an Australian games developer leave the scene – it's unknown at this time what plans Harrison and Siegele have as far as their interests in the industry are concerned.



BioShock looks hot. Shame we have heard squat about it in months.

geekette

A girl's eye view of the gaming world



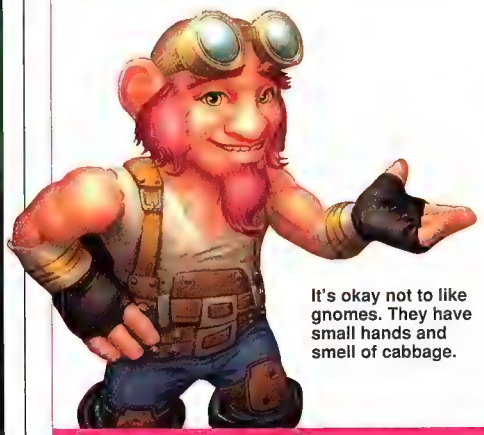
World Of Warcraft has proven to be even more popular than the girl in my Year 8 class who developed early. This, to someone who only too well knows the pain of being cursed with perfect health rather than an overactive thyroid, seemed unfathomable considering that I had only recently emerged from a nasty case of console remorse. Lulled early into a false sense of security by a couple of addictive titles, quite a lot of the games I've played since have elicited little more than a brief burst of purchase euphoria, followed by 48 consecutive hours of eye-strain and frustration, only to end in a climactic sense of loss over the thought of money that could have been better spent on shoes.

I nearly fell right out of my favourite pointy-toed heels when I first discovered *just how many shoes* it actually costs to play World Of Warcraft. Not only do you have to front up the cash at the initial purchase, *and* pay for Internet access in order to play, but there's also a cheeky subscription fee for the privilege. While nursing my bruised wallet I found myself wondering about whether Blizzard's overwhelming success was due to the possibility that once you start playing, you have neither the time nor the resources to *play* any other games!

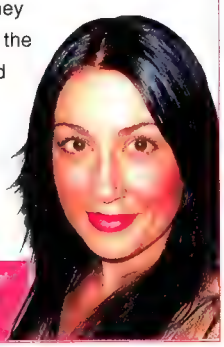
As anyone who has ever sat down to play World Of Warcraft will tell you, it's neither time, nor financial pressure that keeps you online: its inclination. Unless you've seen it for yourself it's hard to imagine just how expansive the world is, how beautifully the characters are crafted and how rich the gameplay is – trick or treat anyone? It's a game so thoroughly immersive that not even a sale in the *Manolo Blahnik* section of Myer could drag me away from the computer.

So if a monthly debit of my account alone was enough to guilt me into playing the game, then surely that same premise would work with my gym pass? Hah! For the past six months the only thing getting a workout is my bank balance, and thus-far all that my gym fees have bought me is a postcard saying 'We haven't seen you in a while...'

But that's because they haven't been looking in the right place. They should try The Barrens!



It's okay not to like gnomes. They have small hands and smell of cabbage.



Kate Lockwood is currently at Atari Melbourne House. Prior to games development Kate spent six years in advertising and journalism, she started at the ABC in Canberra where she is still involved as a mentor for the Women in Games Pathway, presenting regularly at conferences on the topic.

talkinghead

Logan tells you everything you really need to know about gaming

Explore, expand, exploit and exterminate

Logan Booker gets his 4X strategy on.

Every now and then I check up on various 4X strategy games currently in development, despite the fact that I will probably never play them. 4X games take a damn long time to play, and there have been many times when I've reached a stalemate because dominating the universe would require more man hours than I have to abuse. When I was younger and had time to waste, I relished the task of annihilating my alien opponents planet by planet... but these days it's just way too much for a single galactic empire and its interplanetary cronies.

I have trouble remembering exactly which 4X I played first – Space Empires II or Ascendancy. If I close my eyes real hard and search my dusty repository of childhood memories, I'm *reasonably* confident that it was Ascendency.

Ascendency was a gorgeous piece of work for a DOS game. Created by Logic Factory, a company founded by two ex-Origin guys, Ascendancy sung to me in ways that would put Sirens to shame.

My strategy for any 4X is to tech hard, to go for the big guns and big ships as soon as I can, and rule my little part of space with a reinforced titanium hull and a pair of particle accelerators. Therefore in Ascendancy I picked the Chamachies, a race who every once in a while got research for free.

It was great. I remember researching a fast set of engines for years and then finally getting them. So there I was, flying around thinking 'Eat my Ion Bangers, bitches,' when suddenly my homeworld was sterilised by nanomanipulators. I then realised that maybe I needed to be more careful with my spending and you know, *actually* build ships with guns and stuff. The AI in any 4X is vicious – it will ally with you when it's fleet is at 99 ships and your's 100, and break it the second it hits 101.

The AI in any 4X is vicious – it will ally with you when it's fleet is at 99 ships and your's at 100, and break it the second it hits 101.

As great as an idea as it sounds, multiplayer 4X just does not work. The many times I played Space Empires II with a few mates, someone would get bored, or feel like they were losing or something else. See, once one person loses interest, it has a cascading effect on the morale of everyone else. No one likes to play a game where they can see no victory and genocide is but 450 turns away. I personally believe that there is not a single multiplayer 4X game in the history of forever that has been played to its final, depressing conclusion. Hey, that's what real-time strategies are for.

No, 4X is most definitely a single player experience. I believe it to be analogous to The Sims – as much as it pains me to make this comparison. It gives you a chance to nurture something and watch it grow, except with 4X you can make use of all that time to help another race to prosper, or just wipe it from the cosmosphere with a fleet of battlecruisers armed with bioweapons so disgusting they'd curl Saddam's pubic hairs.

Although my days of hardcore 4X'ing are long behind me, there are a few games on the horizon that tickle me. Malfador's Space Empires V looks hot, and adds ship customisation, advanced diplomacy options and a sexy-looking real-time combat engine, while Space Dock's Galactic Civilizations 2 is basically improving every single aspect of the original – which was already fantastic. I particularly dig the 3D map of the universe in the main GUI. Yet another one is Sword of the Stars, which features a bunch of races that all play completely differently. Some travel through space in a weird way, or have bizarre weapons that go way beyond the conventions of lasers and missiles. It's a bit rough around the edges at the moment, but it's being developed by some of the guys who did Homeworld, so I'm expecting big things.

Not that I'll be playing any of them. Maybe.

Logan likes dancing with fairies and kissing the pixies.
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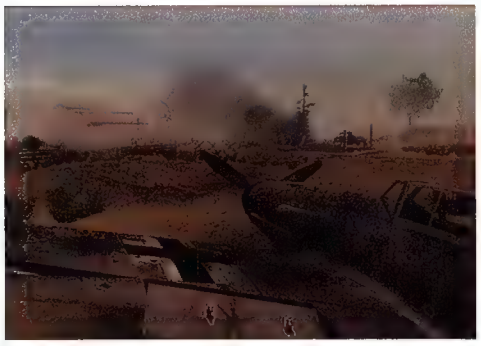
Release date :Q1 2006

Red Orchestra: Ostfront 41-45



There's a good reason Red Orchestra won Epic's Make Something Unreal contest last year. Several good reasons in fact. Not only did it reek of quality and polish, but it also offered gamers something they hadn't really experienced before: a very brutal and very realistic glimpse of infantry combat on the Eastern Front of WW2. And as of early 2006, you'll be able to pick up Red Orchestra: Ostfront 41-45, the standalone successor to the mod, on Valve's Stream online distribution service.

For those not in the know, Red Orchestra is all about team-based game play. Each round sees Russian and German forces fighting it out on maps based on locations such as Warsaw and Berlin, making use of weapons ranging from the MP40 submachine gun to the Mosin-Nagant 1930G rifle. In fact, there are some 28 different firearms to choose from, along with several types of grenades and explosives. While the focus is on infantry, certain maps feature vehicles that include everything from simple trucks to battle tanks.

If you're after realism, Red Orchestra: Ostfront 41-45 – like the mod preceding it – will deliver in half-track loads. For starters, there's no crosshairs – instead, you'll find yourself carefully aiming down the sights of your weapon if you want to hit something. One or two shot kills are the order of the day, with no health packs or medics running around to magically cure you of all your ailments. What this boils down to is a slower and more tactical game play experience that rewards the more cerebral before the twitch gamers out there.

Red Orchestra will also feature realistic ballistics, which essentially means bullets drop over distance. Players are also able to rest rifles on supports in order to increase their accuracy.

Audio effects were something the mod excelled at, and these have been carried over to the retail version. Sound effects are distance-based, a feature which creates immersion and gives the player a sense of actually being at war.

Instead of relying on what Unreal Tournament 2004 has to offer, Red Orchestra features an all new movement system that allows players to dive over obstacles, go prone and peek gingerly around the corners of walls and fences.

Red Orchestra: Ostfront 41-45 is a game that will be well worth checking out if you're into realism or want to see something that isn't simply another World War II game. The critical acclaim the mod has received is testament enough to how good this should be. **CT**

Publisher **Tripwire Interactive** Developer **Tripwire Interactive**
Platform **PC** Website **www.redorchestragame.com**

Release date: Q1 2006

Ghost Recon: Advanced Warfighter

As the third instalment in the Ghost Recon series, Advanced Warfighter not only promises to deliver more of the squad-based game play that made the originals so good, but a stack of new goodies as well.

As per the norm for the series, Advanced Warfighter will give players access to weapons and gear currently under development by the US Army, giving plenty of reason for those into all things military to squeal in delight.

To add even more depth to the tactical aspect of the game, Ubisoft have introduced a new feature known as Cross-Com. Powered by satellite, Cross-Com can be used to command squads, control remote spy drones and order in Apache air strikes to knock out enemy positions. Fans of co-operative play can rejoice, as all of these features are available in the multiplayer campaign.

Whereas the previous titles in the series lacked cohesion, Advanced Warfighter is set entirely in Mexico City. Players are now able to take control of mounted machineguns as they are flown to the next mission, something that will hopefully provide some respite from what promises to be an incredibly intense and challenging tactical experience. **CT**

Publisher **Ubisoft** Developer **Ubisoft**
Platform **PC, Xbox 360** Website **www.ghostrecon.com**

Release date: Q1 2006

Commandos: Strike Force

The popular Commandos franchise is back, this time as a first-person shooter. Gone are the isometric view and the Jagged Alliance-like gameplay and in their place is a frenetic World War II shooter where the player must use three characters – a Green Beret, a Sniper and a Spy – to accomplish their goals. You can take two with you on a mission and switch between them as necessary, each providing different levels of stealth and damage. According to Pyro, the game will have 14 missions, each broken up into large sections. When you've conquered this you can move onto the multiplayer, which includes deathmatch, team deathmatch and 'sabotage'. Commandos: Strike Force makes use of Criterion's Renderware, so it looks and plays great. Of course in true Commandos style, every mission will have a variety of ways to be completed and Pyro expects around 15 hours of gameplay total. sophisticated and intelligent, which, now, means dinosaurs. **LB**

Publisher **Eidos** Developer **Pyro Studios**
Platform **PC**
Website **www.commandosstrikeforce.com**

STRAIGHT TO HELL

Logan Booker chats with Flagship Studios' CEO Bill Roper on the developer's first title, Hellgate: London.

A journey filled with fighting evils in a role-playing game would hardly be complete without the appearance of a fire-wielding, red-skinned creature from dimensions hellish. While Doom may have popularised the use of these sinister, fantastical monsters as enemies, it took Blizzard's Diablo to give them character and to use them as more than just an animated obstacle.

No longer was the average demon-filled game about blasting cacodemons with a double-barrelled shotgun – the character of Diablo in Blizzard's seminal game was *the* lord of evil, complete with back story – one that easily struck pants-browning fear into every player who ventured into the depths of the game's randomised dungeons.

Randomisation was a big thing for Diablo. It was one of many features key to the game's success, and made the 'slot-machine mechanic' a common fixture in RPGs that followed. The addictive nature of killing 'just one more monster' or opening 'just one more chest' in the hopes of finding a stat-packed artifact to impress your mates proved strong enough to sell millions of copies of Diablo, its sequel and their expansions.

Suddenly, Blizzard found itself in the midst of its own roaring success and it didn't take long for a face to emerge to liaise with the community. That face was of Bill Roper, vice president of Blizzard North, the developer's RPG development arm.

However, in October 2003, Roper, along with three other Blizzard North employees tendered their resignations after a communication breakdown with Vivendi Universal, the parent company of Blizzard. Taking their destinies into their own hands, the four went on to found Flagship Studios. Hype began to build around the newly-formed company and its projects, but through it all Flagship remained tight-lipped.

It wasn't until April 2005 that the company announced is first game, Hellgate: London, a combination of RPG and FPS. And it has everything – the role-playing, the randomisation and, of course, demons.

Lots of demons.

Hell's bells

'We started working on the game, or at least coming up with the kernel of the idea, literally the day we started Flagship Studios – well before we even had a name for the company,' explains Bill Roper, CEO of a young Flagship Studios.

'The earliest work was a very rough general game concept that focused on creating an action RPG with a dynamically generated game

To compensate for the fact that weapon accuracy is dependent on attributes and not player skill, Hellgate: London will incorporate soft auto-aiming, 'bending' munitions and area-of-effect damage.

space that would be experienced from the first-person perspective.'

It's a story that meshes the best parts of the modern day with ancient myth and spices it with hellish overtones. Set in London a few years in the future, Hellgate throws the player into the aftermath of a demonic invasion of Earth, where they must fight to survive against the legions of evil. In the fray are the secret orders of the Knights Templar and the Freemasons, who use a combination of magic, swords and munitions to combat their enemies.

'The more we worked on the game, the more we found about the myths and roots of the city [London], and the more we looked into the secrets there, the more our world and storyline [took] shape,' says Roper.

The design of the game raised a number of questions. Firstly, the team wanted to develop a 3D engine that could generate random maps. That includes elevations, structures, lighting, and monster and item placement, not to mention creating dynamic quests and locations within that map. It's a big task with a 2D game like Diablo, and a staggering one in 3D. But the dynamic engine wasn't the only element Flagship had to wrap its head around.

'How would RPG-related combat, not to mention melee combat, work from the first-pers perspective?' asks Roper. 'We've seen it to som extent in Troika's Vampire: Bloodlines, where was a hit and miss affair, and a more visceral version is in Bethesda's Elder Scrolls 4. Fitting FPS action into an RPG mould requires finding a balance between the player's reflexes and their character's skill set.'

Although both fans and the media were left in the dark, spending a year and a half putting

Players will battle all manner of demons, many who can't be hurt by normal means.

'ALTHOUGH WE DO USE THE FIRST-PERSON PERSPECTIVE, WE ARE CREATING AN RPG, SO WE DON'T BELIEVE THAT WE REALLY COMPETE HEAD-TO-HEAD WITH THE FPS MARKET.'

'We feel that the concepts of randomisation, customisation and collectability make the game stand out from both FPS and other RPG titles.'

out problems like this seems worth it after the game's announcement.

'We wanted to make sure that when we announced Hellgate: London, the press and the gaming community could see what our vision first-hand. This was especially important to us because we don't think that there is any game quite like what we're making and being able to see and play a game answers a lot of questions.'

Skill or die

'Although we do use the first-person perspective, we are creating an RPG, so we don't believe that we really compete head-to-head with the FPS market,' he explains.

What makes it an RPG? Most first person shooters come with, at most, 20 weapons. Hellgate will boast an arsenal of 100, along with armour and miscellaneous equipment. There's also the skill and spell system, which, according to sources, started out looking like the Diablo 2 skill tree but evolved into a new system of which details are scarce. However, it's said it will allow players to create custom abilities simply by building up different skills. Of course, Flagship says that the system is still in development, so it could change before the game is released.

'[... It has] everything you'd expect to see from a role-playing game,' says Roper. 'Our game play is definitely action-based [however], so we do think that FPS players are going to enjoy the deepness of the experience.'

Hellgate: London will adopt a similar combat system as Troika's Vampire: Bloodlines. Although there is some aiming involved with shooting and striking, a combination of statistics and gear will determine whether you hit or miss. Hopefully players won't find this mechanic frustrating – it proved to be decisive in the enjoyment value of Morrowind. Roper says Flagship will account for this using auto-aim, homing and area of effect weapons. 'Classic RPG elements will determine the player's success in the game, not FPS skills.'

Like any RPG, Hellgate will feature classes, of which only the Templar has been revealed. The class uses a combination of magic, melee weapons

Hellgate: London relies on some sophisticated engine technology, in addition to standard randomisation techniques, to make each play-through a new experience while retaining cohesion of the main story.

and guns to combat foes, and looks to be the 'jack-of-all-trades' class in the game. As development continues, classes will appear that will focus on ranged or melee combat, support and even stealth.

Random acts

Every man and his C++ compiler is making an FPS these days, but Hellgate: London has taken the ambitious route of randomising the game's environments and side quests to give the game a huge amount of replayability.

'We've been working very hard to get the message out about how unique the game experience is with Hellgate: London... We do feel that the concepts of randomisation, customisation and collectibility make the game stand out from both FPS and other RPG titles while also providing massive amounts of replayability,' says Roper.

Of course, the game features a number of set quests, pivotal to the game's main story. The way in which you go about completing them, the areas in which they are set, and the side quests you'll have to do between completing them will be randomised.

The approach Flagship has taken with the engine involves laying out certain main sections (such as a building) and joining them together with pathways, like tunnels or city streets. Instead of referring to say, a Binary Space Partition (BSP) like Quake-based engines, Hellgate has to figure out lighting and visualisation maps during level generation *on the fly*, and then place objects into the level in a sensible manner. It's one thing to randomly place items and monsters, but another to make sure an area isn't too hard and provides the player with enough resources to survive.

Add to this the problem of making the levels look and feel right graphically, and a year and a half of development just doesn't seem like enough time.

'We are also very aware of how important it is to have our game play on as many systems as possible, and have just recently been going through our first heavy optimization phase,' explains Roper.

'Our engine is also quite scalable, so while there will be some big differences between the high end and low end, we think the game is going to look very good even on the lowest end systems we can support. It is still too early for us to set a minimum specification, but we're already playing the game on laptops, if that is any indication of our early progress in this area.'

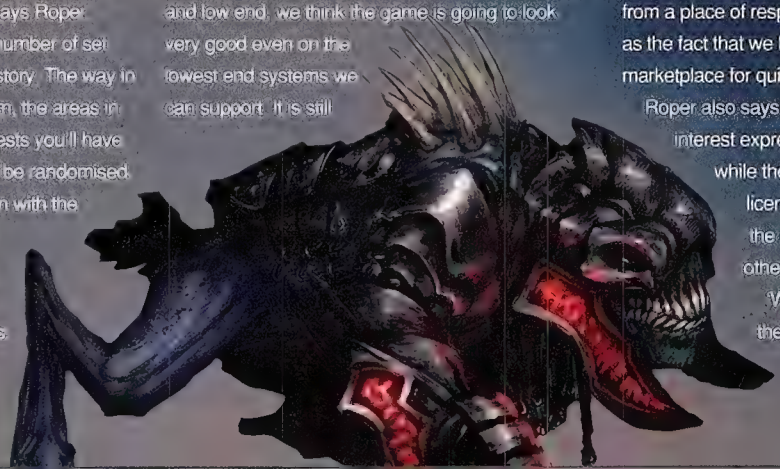
To hell with it

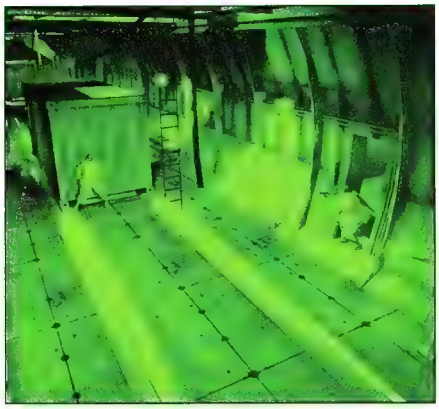
If Hellgate: London had a release date, you'd be reading about it here. Right now, it doesn't have one, so we'll have to wait patiently for Flagship to figure out how long its ambitious title will take to complete. At the least, Hellgate has a number of publishers, including Namco, so distribution is assured. Not that Flagship was in any rush to secure one.

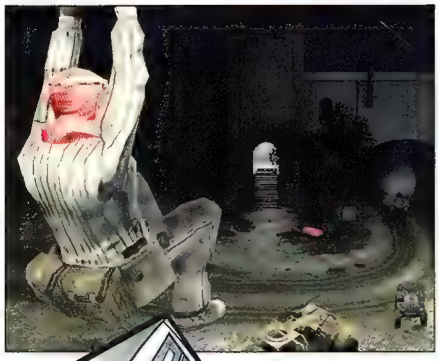
'We purposely took our time so that we could meet with and talk to anyone who showed an interest in us from the very beginning, explains Roper. 'We felt that this was quite important, both from a place of respect for that interest, as well as the fact that we hadn't been out in the open marketplace for quite some time.'

Roper also says that Flagship has 'had a lot of interest expressed in [its] technology' and while the company has no plans to license the engine it hasn't ruled out the chance of seeing the tech in other games.

'We're pretty focused on getting the game done right now,' he says.







Battlefield 2: Special Forces

Christopher Taylor crawls through the mud with wire and a pocket knife.

Back when Road to Rome was released for Battlefield: 1942, there was a feeling that it didn't really add much to the original game. Sure, there were some new maps, but the pack simply wasn't worth the $45 EA was asking. While Battlefield 2 is a totally new game with a different setting and lots of material that could easily be expanded upon, it's easy to see why fans have been somewhat nervous about picking up its new expansion pack.

As the title suggests, Battlefield 2: Special Forces sees players take the role of elite soldiers, engaging in what EA calls 'all-out war behind the scenes.' What this boils down to is maps that are, for the most, part smaller than what the original game had to offer, making for more focused combat and a faster pace.

Instead of playing as a member of the PLA, USMC or MEC, this time around you'll be fighting for either the British SAS, US Navy SEALs, Russian Spetsnaz, MEC Special Forces, Rebels or Insurgents, depending on the map you're playing on. Each force comes complete with unique skins, flags and voices, which is a nice touch.

Combat takes place across eight new maps, ranging from aircraft carriers to the compounds of Middle Eastern warlords. While a couple of these maps are excellent and surpass the quality of the original game's offerings, many feel a bit weak. Due to the nature of the subject matter, much of the fighting takes place at night or indoors. Sadly, indoor combat feels rather dull, which is probably due to the fact that despite the new material Special Forces brings to the table, Battlefield 2 is still primarily a long-range, outdoors combat game.

To help you fight the sneaky fight, Special Forces comes complete with a few new bits of gear, including night vision goggles, gas masks, zip line launchers and grappling hooks. Every class is equipped with these, meaning wall-scaling fun is available to all.

There are also a number of new vehicles, including civilian cars, jet skis, quad bikes and a couple of new helicopters. While some of the new vehicles seemingly encourage players to act as lone wolves and have just been taken straight from Desert Combat, it must be said that they're generally a lot of fun to hoon around in and feel right at home in the context of the game.

Despite a few minor flaws, Special Forces is a lot of fun to play and adds enough content to Battlefield 2 to make it a worthwhile purchase, especially when factoring in the $35 price tag. After all, who doesn't want to zip line over the streets of Iraq at night?

PC

Dice
EA Games
www.ea.com

1.7GHz CPU; 512MB RAM; DirectX9.0c sound and graphics.

VERDICT

Cool new gear; feels like a new game; some excellent maps.

New vehicles taken from Desert Combat; boring indoor combat; some terrible maps.

score **7.5** OUT OF 10

The first wave of US infantry was repelled not by the Germans, but by chronic shrinkage

Call of Duty 2

Christopher Taylor will see you on the beach.

2003's Call of Duty was a huge success for Infinity Ward. While some criticised it for essentially being a bigger and better version of Medal of Honour, it was considered by many to be an absolute gem of a Hollywood thrill ride, offering many a memorable moment and intense game play from start to finish.

The sequel, however, takes things in a slightly different direction. While it's still all very Spielberg, it leans away from the car chases and one-man army segments of the original, instead opting for more realistic, larger scale battles set in locations such as Stalingrad and the Rhine.

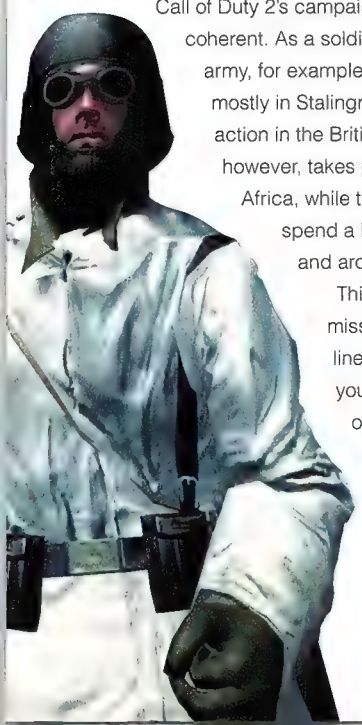
Instead of an unfocused series of missions, Call of Duty 2's campaign is far more coherent. As a soldier in the Russian army, for example, you'll be fighting mostly in Stalingrad. Most of the action in the British campaign, however, takes place in North Africa, while the Americans spend a lot of their time in and around Normandy. This time around missions are far less linear, often tasking you with multiple objectives at a time and allowing you to pick which one you'd like to do first. This moves away from the 'stuck on rails' like feel of the original, and means you're able to flank the enemy and attack from different directions, just like you'd expect from a game that's attempting to recreate some of the most famous and dramatic battles of World War 2.

As well as this, maps are now larger and far more open, making for incredibly intense game play as you advance on enemy positions, darting from tree to rock to burnt-out car for cover.

On the whole, the campaign is of a much higher standard, with only a couple of disappointments. The most notable is perhaps a car chase in one of the British missions – while it's not especially difficult or frustrating, it just feels kind of lame when compared to the rest of the game.

Like the original, Call of Duty 2 relies heavily on scripting. For th most part it's done well, especially during enemy counter-attacks and the like. At other times, however, it's a tad buggy and can lead to things like being stuck at the top of a ladder until some of your fellow soldiers have passed you. Such moments serve only to ruin the sense of immersion.

Call of Duty 2 is the perfect example of what happens when a developer listens to the fan-base rather than rushing blindly into a sequel. Despite the odd flaw, Call of Duty 2 is a well-polished shooter that provides a wonderfully intense and exciting experience that differs enough from the previous game to make it worthwhile.



PC

Infinity Ward
Activision
www.callofduty.com/cod2

1.4GHZ CPU; 512MB RAM; RADEON 9200 or GeForce 4

VERDICT

Intense gameplay; excellent graphics and sound; Utah beach landing.

Some scripting bugs; the odd weak mission.

SCORE **8.5** OUT OF 10

Vietcong 2

Too boo-coo, G.I. Christopher Taylor watches out for Charlies in the trees.

PC

Pterodon
2K Games
www.vietcong2-game.com

1.8Ghz processor, 512MB RAM, 128MB video card

VERDICT

Trash-talking squad mates amusing; story and execution of Vietcong missions; Half-Life-style introduction.

Graphics; physics; feels lazy and lacks polish.

score **6.5** OUT OF 10

As the sequel to the first and perhaps only game to really nail the Vietnam War experience, it's reasonable to expect Vietcong 2 to be at least half decent. It's also reasonable to expect that it will be a reasonably polished affair, considering there's so much competition from titles like Brothers in Arms and Call of Duty 2.

Whereas Vietcong offered gamers a taste of brutal jungle warfare, the sequel takes the action to the city of Hue. Set in 1968, the campaign is based on events surrounding the Tet Offensive, showing them from the perspectives of both the US Special Forces and the Vietcong themselves. Beginning with a lengthy introductory sequence that manages to successfully build a lot of tension, the single player campaign is often intense and manages to capture the feeling of being part of a war.

As a captain in the Special Forces, you'll be charged with tasks including securing enemy positions, rescuing hostages and assisting friendly forces. When the campaign switches over to the Vietcong, you'll find yourself using more guerrilla-style tactics; ambushing convoys and chasing enemies into the jungle.

Enemy AI is reasonably bright and handles fire fights impressively, but your trash-talking squad bumble about like morons, often failing to take down even the most vulnerable of enemies. You can give them orders, but the interface is awkward and they're only useful as cannon fodder.

Technology wise, Vietcong 2 looks and feels about three years old. There's no rag dolling of any sort, with enemies often falling through walls and railings. Despite looking ghastly on even the highest settings, the frame rate often slows to a crawl during cut scenes and at the beginning of battles.

Multiplayer is a fairly stock-standard affair for this sort of game, featuring modes such as death match and capture the flag. It seems doubtful that it will take off this time, meaning if you're into the online gaming scene you might be better served by something like Call of Duty 2.

It's a shame that the execution is so absurdly hit and miss. The campaign mode simply lacks polish and scripting errors can be found in abundance, often ruining immersion and turning gameplay into a chore. Considering how much Call of Duty actually excels in this area, it's difficult to understand how they went so wrong – this sort of thing simply isn't good enough any more.

Three years ago, Vietcong 2 would have been a great game, but now, the genre has moved on. No matter how many enjoyable moments the campaign may have, the fact remains that the execution simply isn't good enough in today's gaming world.

Rollercoaster Tycoon 3 Gold and Wild

Christopher Taylor loves making the little people sick

Be it the rides, the alien-like carnies or just the general trashiness, it's hard not to love theme parks. Just imagine how cool it would be to run one. Well, your chance has finally come with Rollercoaster Tycoon 3, the latest in Microprose/Frontier's franchise. Just like previous games in the series, it sees you as the manager of a theme park. You'll be responsible for designing rides, hiring staff and doing everything you can to make the little people hand over their hard-earned.

Like most sim games, Rollercoaster Tycoon 3 is a single player affair, offering both scenario play and a sandbox mode. In the scenarios, you'll find yourself taking over already established parks, adding your own flavour to them in order to meet goals such as having a certain number of people in the park at one time or a specific amount of high intensity rides. In the sandbox mode, you'll find yourself totally unrestricted by silly things like budget and real estate and you'll be able to get down to the serious business of creating the wildest rides imaginable.

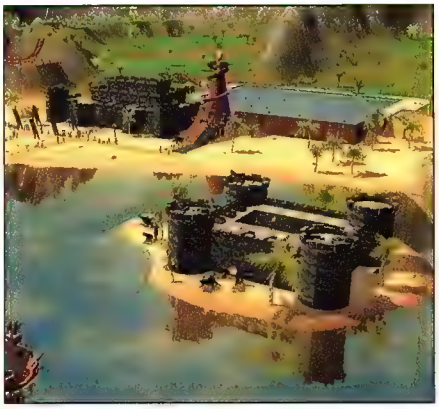
In order to ease you into the experience, the game features a number of tutorials. Sadly, these feel somewhat disjointed and you'll have to figure out most of it out for yourself.

This is a game that's all about options. In fact, it could be said that there's almost too many options and that altering them is too often pointless. While creating your own roller coasters is fun, it all feels a little excessive when you have to select from a long list of pyrotechnics for a firework display.

Graphically, the game is very pretty. Whereas the predecessors looked somewhat dated, Rollercoaster Tycoon 3 is wonderfully detailed, right down to the expressions on people's faces, the clothes they're wearing and the food they're eating.

Bundled in the Gold pack is Soaked!, an expansion that adds a number of water-themed rides and scenarios to the game, including whale shows, swimming pools and aquariums. Just like in the original, the amount of options is excessive – you even have to specify which type of cleaning chemical you want used in the pools.

Along with Soaked! is another expansion, called Wild! Aside from a number of new scenarios, rides and a new staff member, Wild! introduces animals to the Rollercoaster Tycoon 3 experience. Surprisingly, this aspect of the game is very deep and a lot of fun, letting you buy, breed and sell animals. When animals escape, you have to jump in a helicopter and snipe them with a tranquiliser dart. This is an amusing feature that adds to the experience. The only downside of Wild! is that the dinosaurs are animatronic – you're not allowed to create your own Jurassic Park. Still, you can't have everything. Well worth the cash if you love the original.



PC

Frontier
Publisher: Atari
Website: atari.com/rollercoastertycoon
Recommended: 1Ghz processor, 256MB RAM, 64MB graphics

VERDICT

Sexy graphics; design your own rollercoasters and ride them in first person.

Sometimes too many options; scenarios occasionally a little dry; a bit too busy.

Score: 8.0 OUT OF 10

Answers and questions

Daniel Rutter has what it takes. We're not entirely sure what it is that he has, but he uses it well. In fact, you can help him use it by sending your technical queries to **io@atomicmpc.com.au**.

Heavy metal

Cooling is one of the things that is constantly on my mind. Lately I have been slowly designing a water-cooling kit. One of the things I was considering was the use of mercury instead of water. Mercury, as a metal, would have better heat carrying properties than water. It would be a kind of moving heatsink, as well as looking really funky and being really Atomican.

I have been told that mercury will expand hugely when heat is applied, so you would have to provide a huge amount of room in the tank for the mercury to expand and a powerful pump to push it around, due to the greater density.

What is stopping us from using a mercury-based cooling kit? The plusses seem at the moment to be outweighing the negatives.

Nathanael Mowbray

This mercury fountain (!) was open to the public at the 1937 Paris Exposition. It's in a glass box now.

Mercury will only actually expand about 2% when heated by 100°C, so that's not a problem. But don't worry, there are plenty of others.

If you spill a drop of mercury on your nice aluminium case and don't notice, it will have eaten a hole through it and seeped into the carpet by the next morning (**tinyurl.com/866hx**). It'll do the same thing to any aluminium cooling jackets it passes through.

And you're not kidding about needing a powerful pump. Water weighs one gram per cubic centimetre; mercury weighs 13.5 grams. That's 1.7 times the density of iron.

If you find an industrial supplier that'll sell you a standard 'flask' of mercury then you could get 34.5 kilos (about 2556ml) for a mere US$850 (prices have spiked recently). But if you want to dispose of mercury legally, you might well have to pay more than you paid to buy it.

Why, you innocently ask, is that?

Because mercury's *POISONOUS*, that's why. It's a heavy metal that can be absorbed through the skin, lungs or digestive tract, and it accumulates in the body and is rather difficult to remove. It affects the brain and liver, two organs to which most people are quite attached.

Metallic mercury emits vapour constantly at room temperature, and readily breaks up into tiny droplets with large surface area which emit much *more* vapour. Metallic mercury's a pussycat compared with various organic mercury compounds, but it still ain't nice.

If you overcame the engineering and financial challenges, you could assemble a mercury-based cooling system quite safely. Wear rubber protective gear, and do the job outside. But if the system isn't *well* sealed, or if a hose pops off at any point, your computer room will instantly become a toxic waste clean-up site.

IOOTM wins a Logitech G5!

It's not just a mouse, it's the bestest mouse of all, if not ever, anywhere, and anytime. It owns you.

Hoover-induced failure

I have a generic Taiwanese MP3 player which I use while I'm at work as a cleaner. I have no problems with it until I start using the vacuum cleaner.

Whenever it gets near the player, the player restarts. I have no idea why.

It doesn't do it any other time (except when the battery is about to go flat, and I check this every time it happens).

So... any ideas why this might be happening?

Morris

Vacuum cleaner motors, like a lot of cheap electric motors, emit a lot of RF noise. Vacuum cleaners, power drills, electric shavers; all spark merrily inside, which is why you should never use a normal vacuum cleaner to suck flammable vapour out of anything. Sparks create broadband RF noise, often way up into the microwave range – so motors can sometimes screw up wireless networking connections, too.

Cheap MP3 players (and, I'm sure, some of the expensive ones too) have crummy shielding, and the RF noise induces current in their circuitry and freaks them out. You might notice similar symptoms if you left the player sitting next to a digital mobile phone when it chatted with the local cell tower – various gadgets, including some fancy LED flashlights can be affected by that.

There's not a lot that can be done about this; wrapping the player in the Unmedicated

Schizophrenic's Friend, aluminium foil, will only work if the foil is earthed. It'd get a (crummy) earth if it was in contact with your body, though, which might be enough. Otherwise, just keeping the thing away from the vacuum would be adequate – look like a dork and wear it on a neckstrap or headband or something.

Objective Performance Criteria?

I have a Philips CDR 600 CD recorder. It used to work fine, but now almost every time I try to record to a disc, the machine takes ages to do its verification bit and then flashes up 'OPC ERROR'.

Is this a disc problem? Is the machine telling me it's had enough and is retiring? Can it be fixed, or is it a replace and chuck the old one situation?

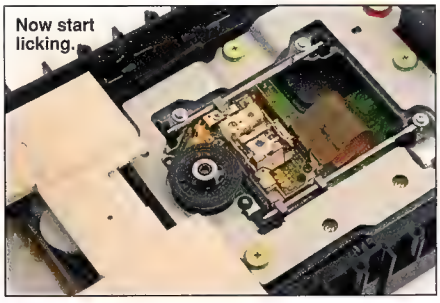
Pete

The error means the recorder's failing to do its power calibration (**tinyurl.com/c9jtx**) – the initial test it does on the disc to determine the write laser power it needs. And yes, it's probably symptomatic of a larger problem; writer laser diodes do wear out.

If you haven't recorded quite a lot of discs, though, the diode should still be OK – but there might be some mechanical problem. These things are built down to a price, not up to a standard.

It's possible that this error, or any number of other errors, may just be the result of fluff on the lens. One of those cleaning discs with the teeny brush sticking out of it ought to clean the lens quite well without requiring you to fish around inside the machine with a long cotton swab. Cleaning discs are unlikely to be well balanced, though, so you should not put them in high speed computer CD/DVD drives. Standalone recorders like yours ought not to spin that fast.

The best way to clean optical drive lenses is by taking the gadget apart, so you can actually look at the lens and clean it with a little brush, or whatever. This isn't actually very hard or dangerous (all you're likely to need is a couple of Phillips screwdrivers, and yes, you should unplug the recorder first...) but can still be daunting for beginners.



Now start licking.

Note that just sticking an air duster straw in there can fix a dust problem, or make it worse. There's probably plenty of dust in there, which is perfectly harmless unless you stir it up and it goes somewhere important.

I/O OF THE MONTH

Flashing lights

An idea occurred to me after reading the *Atomic* review of the Gigabyte i-Ram and noticing the 150MB/s limit on SATA bandwidth. Why not use optical cable to connect devices? So I Googled it and found the speed of optical to be up to 10GB/s! Googling further, I found something Intel was doing: tinyurl.com/9coz7.

So the idea ain't new, and there seem to be some developments... but what bugs me is that this technology already exists! I've got optical cable connecting my DVD player to my sound system!

So, just out of curiosity, why don't we already have optical connections?

Jason Phua

Copper may be running out of puff for super-fast CPU connections, but it's a long way from its limits in the storage department.

People are using optical connections for storage and networking right now. Fibre Channel (FC) over optic fibre is actually in common use in the enterprise storage market.

The advantage of FC, though, is that it lets you hang a vast drive array or whole busy network off one slim cable, and run that cable quite a long way. If you're only doing home or small business computing tasks, you don't need that bandwidth or range – even an eight-drive hardware RAID array will be fine using Ultra SCSI or even FireWire. And your array probably won't be in a building a quarter-mile down the road.

When you need to pack huge amounts of data into a long distance cable, optical is the way to go. But for less demanding purposes, and for lower cost, copper still cuts it – a lot of the world's FC setups actually run the FC protocol over twisted pair copper cable!

Your home theatre system uses an optical cable for... well, for no terribly good reason, actually. The highest bandwidth that S/PDIF cable is ever going to have to carry is that of cinematic DTS audio, which only needs the same 1,411,200 data bits per second as uncompressed CD audio.

That bit rate's pathetic even compared with the ancient 10Base2 Ethernet, and well within the abilities of a very cheap cable, as all the millions of people who use electrical S/PDIF over a $4 RCA lead can testify.

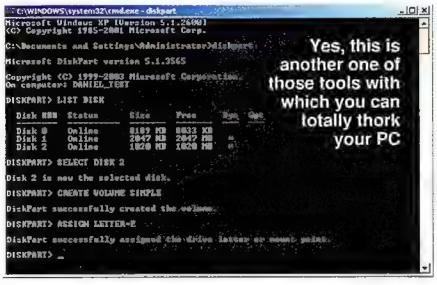
It's a (bigger) RAID!

In one of your columns, you said it is not possible to expand a software RAID 5 array without wiping the array. Isn't it possible to expand the array with Microsoft's 'Diskpart' program?

Vincent Buchan

Nope; Diskpart can only expand basic volumes, and dynamic simple or spanned volumes.

Basic volumes can only be expanded onto contiguous space on the same disk, but that's what you get from a proper RAID controller; a hardware RAID array looks like one physical disk to the computer. Adding disks to the array makes it look as if that disk has magically expanded.



All proper RAID controllers let you add disks. Cheap ATA RAID controllers still don't. This is presumably because there's no real demand for that feature in the entry level pseudo-hardware (cheap controllers all do some of the RAID work in the driver) RAID controller market. Most people who use these controllers, including me, don't use the RAID features at all.

But fancier ATA RAID controllers let you add disks – 3Ware's 9000-series SATA controllers, for instance, have what they call 'On-line Capacity Expansion (OCE)'.

This is all very well, but Diskpart still can't expand software RAID.

hotbox

The best reader-submitted custom made boxes every month!

Welcome to Hotbox! Each month you'll find the winning Hotbox of the month and runners up as voted for online at **www.atomicmpc.com.au.** Want to win? Submit your box now!

Comrade MicktaculA's Darth FurMaul

My Hotbox is mainly used for digital video editing so I can't really say the outside of my PC is important. However when you're the cousin of Bastard Child it's best to let him just mod your computer just to get him to STFU. The idea behind this Hotbox was to incorporate my video production logo and a FurMod of Darth Maul. It's hard to see from the pics but Darth FurMaul is actually a 3D face (head, eyebrows, nose, lips and chin are made from epoxy), his blue hood is removable, his horns (stuck on with Velcro) are engraved wood (and intricately painted) and his eyes are LED lights which illuminate when the HDDs tick over.

Comrade MicktaculA's

technicaldetails

- Intel Pentium 4 2.6GHz @ 3GHz
- Gigabyte 8IPE1000-G
- 1GB PC3200
- 320GB SATA HDD
- ATI RADEON 9800
- Creative Soundblaster Audigy 2

John's 'Bluey the Skull'

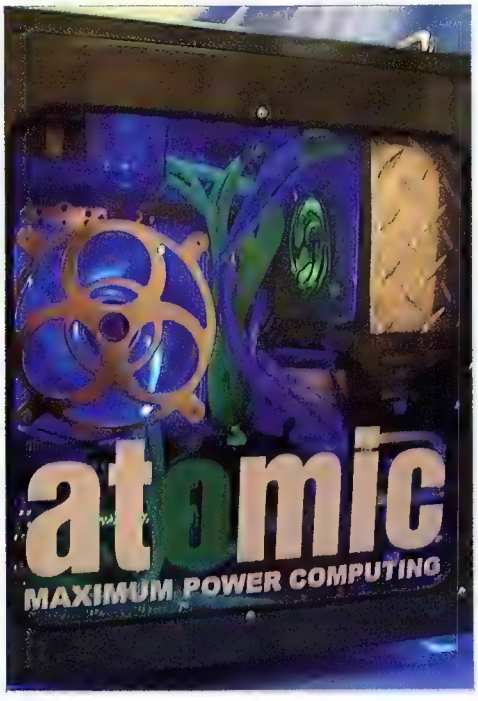
The case was purchased from a computer fair and is completely plastic, so we decided to jigsaw an opening in the side panel. This was for a perspex window purchased from Bunnings to go in. We mounted the window using some rubber door seals from Clark rubber, to make it look clean. We then proceeded to install all the new hardware we had ordered and sleeved all the cables in UV reactive sleeving. We installed a twin UV PCI fan card, checker-plating from Super Cheap and a polished skull fan grill and four LED fans for extra cooling. A switch to turn on and off the UV light was also installed.

John

technicaldetails

- AMD Athlon 64 3400+
- ASUS K8N-E Deluxe mother-board
- NVIDIA GeForce4 MX 440 AGP
- 160GB Seagate SATA
- 512MB RAM
- ASUS DVD burner

hotbox OF THE MONTH



Hazza's Boxen

After I received a copy of Atomic bundled with my (then) regular PC magazine, and seeing some of the really cool cases people had submitted to the Hotbox competition I decided to give it a go and got heaps of help from the forums (thanks everyone). It started life as three broken cases bought at the local tip for $10. After some Dremel therapy I cut a window with a hole for the 120mm fan, holes for four 80mm fans in front, two in the rear and also an 80mm blowhole. I cut and shunt the bezel from two of these cases to fit, and added a coat of auto metallic grey paint. Finishing touches included a 5 1/4in drive bay cover with fan and a raised case floor to hide the wires and sound proofing sheets, and the hand-cut atomic decals.

Hazza

technicaldetails

- Intel Pentium 4 2.6GHz @ 2.8GHz
- MSI 865G Neo2-PLS motherboard
- Gigabyte NVIDIA GeForce 6800 GT 256MB
- Seagate 80GB hard disk drive
- Liteon CD-RW 40x/12x/48x
- Matrix Orbital MX232 LCD

Fame, fortune, and free stuff can be yours! Send your Hotbox to hotbox@atomicmpc.com.au and include the following:

- 3-4 high resolution, well lit, pictures.
- A 250 word description of how you made it, the obstacles you overcame, the tools you used, and your inspiration.
- A detailed list of the machine's specs.

atomic classifieds

Expose yourself to the Atomicans. Atomic Classifieds the best way to show your stuff

matchbox

Competitive performance PCs Atomic style

We're Atomic. You're Atomic. We know how to build powerful machines. And so do you. So welcome to an all new section, dedicated to the glorious pursuit of performance computing. Overclocking, watercooling, tweaks and mods – whatever it takes to build the biggest, baddest, fastest mofo machine on the planet.

We've specced and built a beast machine, but can you beat it? Is your PC faster? Prove it!

In these pages we will feature contenders to beat the Matchbox machine. Both will be run through a gruelling set of benchmarks, and the winning box announced. If your box can beat ours then fame, glory, and the adulation of the opposite sex await you. Oh, and perhaps the biggest, most expensive prizes Atomic has ever offered! But even if victory doesn't come, your box will henceforth be listed on this page as one of the fastest machines in the *world*.

Here's how it works: You can see our Beast Box below. Lets call it *Version 1.0*. You've got some of the specs, so you have an idea of what you need to beat it. Use all your resouces. Hardware and overclocking, cooling and modding, drivers and registry tweaks. Whatever it takes to build the fastest box in Oz.

Submit the details via email and we'll take it from there to arrange benchmarking in the Atomic Labs. The machine with the highest score wins. It's that simple.

The configuration of the Atomic box will stay the same until it is beaten. So if one contender doesn't beat it, it's onto the next. Then, like Hotbox, we'll gather together all the winners at the end of the year for a final battle of who can build the beefiest box, and win a grand prize so sumpreme it makes supreme pizza look like Hawaiian. So are you hardcore enough?

ATOMIC'S BEAST BOX 1.0

Motherboard
ASUS A8N32-SLI Deluxe

Central Processing Unit
AMD Athlon64 FX57

Memory Subsystem
2GB OCZ PC4000 EB Platinum

Graphics Subsystem
2 x Leadtek 7800GTX TDH Extreme SLI

Hard Disk Storage
2 x WD 10k Raptor 74GB in RAID 0

Cooling System
Thermalright XP120 + 120x25mm fan

Power Supply Unit
Coolermaster 550W PSU

BUILD A BOX TO BEAT IT, OR SUBMIT YOUR READY-MADE MACHINE, AND ENTER MATCHBOX TO WIN!

HOW TO ENTER

Submit your box details to **matchbox@atomic.com.au.** Send pictures, your name and address, and a contact phone number. Get to it and lets see if you've got what it takes to take down our beast!

Free stuff for the win!

To enter, go to www.atomicmpc.com.au/competitions. You can only enter once per competition or you'll be disqualified. You must provide a postal address and phone number for prize delivery when you enter (not a PO Box).

3 x Thermaltake Media Lab

HTPCs are becoming the Hot New Thing, and aside from a slew of special HTPC designed cases we're also getting a swank selection of smooth devices like Thermaltake's Media Lab. This stupendous little gadget can turn *any* PC into a fully functional HTPC compelte wtth remote! More than this, it'll even let you turn your machine on or off remotely at the touch of a button! How cool is that? Picture this: you come home, gently pick up the remote, click, and soft sensual music starts smoothing away the day. Then you jump onto the couch to watch the latest LOST episodes you recorded, and life is sweet. Thanks to Thermaltake (www.thermaltake.com.au) we have three of these great kits to give away!

Q Which institute lays claim to the invention of MP3s?

3 x Func F-Series Mouse Pads

When it comes to mousing surfaces Func Industries have like all the dibs on just about every cool-assed mousing surface the world has ever seen. Why put up with the back of a book or that shoddy piece of cardboard your granny gave you, when you can have the caviar of mousing surfaces! All you have to do is answer the incredibly hard competition question below, and one of these fantastifc F-Series could be yours! Better yet, because Func Industries are all about the right surfaces for the job, if you're a winner of one of these fantabulous pads you get to choose which type of surface you want – the extra smooth, or the medium coarse. Thanks to Gamerzstuff (www.gamerzstuff.com.au) for providing these fantastic prizes up for grabs.

Q What is the common unit of measurement used to represent the roughness of a find-grained surface?

To enter visit **www.atomicmpc.com.au/competitions**. The closing date for entries is 7 February 2006. Winners will be announced in *Atomic 63*. Winners will be contacted by phone and email. *Atomic 59 winners:* 5 x The War of the Worlds on DVD from Paramount Q. Which legendary film director narrated War of the Worlds in 1938 and created mass hysteria? A. Orson Welles. J Martin, Greystanes, NSW. Y. Lee, Eight Mile Plains, QLD. C. McQueen, Clarence Park, SA. R. Colombi, Bondi Junction, NSW. N. Fletcher, Epping, NSW. 2 x Gigabyte Watercooling Kit Q. Why does ice float? A Ice floats because it is less dense than liquid water. J. Morgan, Kooweerup, VIC. L. Attwater, Geraldton, WA

Terms and Conditions of Entry. 1. The promoter is Haymarket Media of 52 Victoria Street, McMahons Point, NSW 2060. Promotion period is from 9.00am on 09.01.06 until 12.00pm on 07.02.06. 2. Entry is open to residents of Australia and New Zealand. Management and employees of Haymarket Media and their immediate families, and any advertising, marketing or promotional firms associated with this promotion are not eligible to enter. 3. Enter by posting or emailing forms to Haymarket Media. 4. The draw will be held at the offices of Haymarket Media at 5.00pm on 07.02.06. Winners will be notified by mail and published in *Atomic 63*. The prizes are not transferable or exchangeable. 6. The judges' decision is final and no correspondence will be entered into. 7. The promoter reserves the right to publish the winner's name and suburb for promotional purposes. 8. All entries will become the property of Haymarket Media.

atomic
...which junk food pwns the most?

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haymarket

April 2003 - March 2004: 29,948

websight

A hands-on look into the awesome Atomic community.

Moz Well, it's the Fifth Birthday edition of *Atomic* and... what?

Hulkster Nope. It's not. That was last month.

Moz What do you mean it's not? What's with the lag?

Hulkster I thought you would be used to being behind the times? One thread I know will still be relevant, even with the lag, is Kimmo's 'Got some H?', the world's longest Haiku. It seems every man and his dog uses that thread as a poetic Blogger.
www.atomicmpc.com.au/forums.asp?s=1&c=1&t=67043

Moz There's are some talented people out there.

Hulkster There certainly isn't anywhere near me at the moment. Usmell tried something along the same lines, but instead went for a more uptown New York feel. His 'Rap Battle' thread tested the skills of the at0mic homie wannabe's.
www.atomicmpc.com.au/forums.asp?s=1&c=1&t=77106

Moz Yo, yo! Wassup in the tech sections, dawg?

Hulkster Why do they make me work with you? Shikimaru posted an excellent AMD 64 overclocking guide that even the n00bs can follow. I'll be consulting it extensively as I try to wring every MHz possible out of my machine.
www.atomicmpc.com.au/forums.asp?s=2&c=6&t=9244

And Morgoth put the challenge out for a battle of the SuperPi's. This was hotly contested by heaps of Atomican tech-heads.
www.atomicmpc.com.au/forums.asp?s=2&c=6&t=8599

Moz Mmmm... pie.

Hulkster *Sigh* Here's something that won't stress your intellect. The Brisvegas *Atomic* crowd had another BBQ meet in December. Even though the soaring temps tried to sap their enthusiasm, the Brissie boys ignored sunburn and ran about like fools trying to impress the girls.

The Atomican 'Hall of Fame', or as we like to call it, the 'online portal to dimensions unknown...'

Moz Girls?

Hulkster Down boy. The *Atomic* girls were far more sensible and stuck to the shade. It seems a good time was had by all if the comments in the post-meet thread are to be believed.
www.atomicmpc.com.au/forums.asp?s=1&c=1&t=76669&p=0

Moz There were girls there?

Hulkster Moving right along... it might have been the heat, but cwapface took the spirit of *Atomic* to extremes and showed the world how much this place means to him... by taking a pair of clippers to his hair. The resultant artistically rendered hairdo was greeted with resounding praise from the online community. Although I don't know if his girlfriend was impressed.
www.atomicmpc.com.au/forums.asp?s=1&c=1&t=76956

Moz Girlfriend?

Hulkster That's it. I'm ignoring you. Taranthor's 'Know your Atomican' thread went from a bit of fun to a community project. Everyone who is anyone submitted ID photos to be included in a mosaic of epic proportions. If you've ever wanted to know what the boys and girls of the *Atomic* forums look like, check out this fantastic effort!
www.atomicmpc.com.au/forums.asp?s=1&c=1&t=76656

Moz There are geek girls?

Hulkster Yes you bloody idiot! There are geek girls! Don't you read the mag's Geekette column?

Moz Is that the one with pictures of the girls in it?

Hulkster *Sigh* Why do I bother?

Moz Do you think Kate Inabinet would go out with me?

post of the month

www.atomicmpc.com.au

With our 5th birthday on, community warmth has been running high. Notable mentions (no mouse, sorry, but our eternal respect):

Shikimaru's Atomican AMD64 overclocking Guide
www.atomicmpc.com.au/forums.asp?s=2&c=6&t=9244
– Great guide, loads of good pointers for n00bs and pro-overclockers alike.

ALL of handle666's guitar tips.
His most recent: ***www.atomicmpc.com.au/forums.asp?s=1&c=1&t=76991***
– Genius threads. So much detail, so original.

Lambo's 5 years of Atomicmpc video
www.atomicmpc.com.au/forums.asp?s=1&c=1&t=76648&p=0
– there wasn't a dry eye here when that nugget landed.

But there can only be one, as they say. POTM 61 goes to:

Want to know who all these crazy atomicans are?
www.atomicmpc.com.au/forums.asp?s=1&c=1&t=76656&p=0

Congratulations Taranthor! Your creation is a wonderful snapshot into the different people here.

fallout

Funnies and humour from the fallout zone

Happy Chrismukkah!

Logan Booker embraces Judaism, Christianity and modern-day soaps with atheistic acceptance.

Not long ago I came to the sad realisation that I hated something for the simple fact that it *existed*. I had no legitimate reason for despising this certain something; no hatchet to bury or free range jackalope to mount on my wall. Not that I'm in the habit of mounting wild jackalopes.

Jackrabbit/antelope hybrids aside, it's important I reveal this something to you before continuing. It is necessary for three reasons.

Firstly, I'm sure it will be therapeutic to admit my error in judgement to a large group of people.

Secondly, I've found I like this thing I once hated – but didn't really hate.

Thirdly, it's hard to write about something when you neglect to mention *what it is*.

Okay. It begins with 'O' and ends with 'C'.

Too cryptic? Then allow me to me bludgeon it into you using nothing but my keyboard.

It's *The O.C.*

And I like it.

A few issues ago I took it upon myself to poke fun at this teen soap opera. I said that *Stargate: SG1*, a sci-fi TV series orchestrated by Richard Dean Anderson (AKA MacGyver), was significantly better than anything *The O.C.* creator Josh Schwartz (AKA nobody) could ever conceive. In essence, I sad that *Stargate* owned *The O.C.*

"I yelled, I screamed, I left a dukie on the carpet. It was no good. Before long, I found myself curled up on the couch, totally, utterly and hopelessly captivated by *The O.C.*"

And at the time, I thought it did.

That's until my better half decided to introduce me to it. During the pressures of exam time, the girlfriend decided to ration out a DVD containing a number of episodes of a show her friends had been raving about. Naturally, I recognised the orange cover and model-perfect faces of the show's cast immediately. I calmly took her by the shoulder, sat her down, and told her it was the worst piece of programming to ever hit television; that it was a urine stain on the bedsheets of entertainment. I shook my head in disbelief and said outright that there was no way I was going to subject myself to the comedic ramblings of Adam Brody. This, coming from someone who had never heard the comedic ramblings of Adam Brody.

I yelled, I screamed, I left a dukie on the carpet. It was no good. Before long, I found myself curled up on the couch, totally, utterly and hopelessly captivated by *The O.C.* I lay entranced like Malcolm McDowell in *A Clockwork Orange*, dumbfounded like Chazz Palmintieri at the end of *The Usual Suspects*, as Sandy Cohen, public defender and all-round nice guy, befriends a young, delinquent yet quietly responsible Ryan Atwood. I failed to move as Seth Cohen provided me with non-stop comedy and Summer taught me the merits of being an airhead.

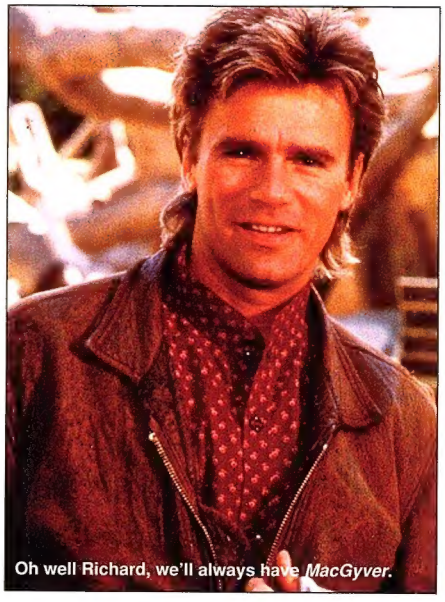
And when Julie Cooper divorced her poor husband I'm not sure what was abused more: Jimmy Cooper or my personal hygine.

Twenty-seven episodes later, I was more than hooked. I was positively giddy with the turmoils of living it rich in Orange County. And I felt like crying. Me, myself and I were guilty of one of the ultimate naughties – judging a book by its cover.

Fortunately for me, there was a way to redeem myself. In fact, I'm doing it now; confessing my sins in printer's ink... and celebrating Chrismukkah, the fusion of Judaism and Christianity to form a new and improved holiday.

Okay, so I'm not really celebrating Chrismukkah. Hell, I'm not even religious.

Besides, New Year's Eve owns it anyway.



Oh well Richard, we'll always have *MacGyver*.

Believe it or not, Adam Brody is actually quite funny. According to my girlfriend, he's also a babe. Bleh.

PowerColor

atomic 2005 READER AWARDS WINNER BEST VIDEO CARD MANUFACTURER

atomic
Video card manufacturer of the year
ReaderAwards2003

Enter a World of Visual Velocity

For the ultimate in performance gaming, the Radeon® X1K Series combine a radically **new ultra-threaded core 3D architecture** and **Shader Model 3.0**, unleashing the most mind-blowing gameing effects. With ATI's revolutionary **Avivo**™ video and display technology to drive performance to new heights with incredible speed and intense 3D graphics. The Radeon® X1K Serues are **CrossFire**™ Ready to deliver multi-GPU gaming performance.

PowerColor X1800 XT
GameFX Board Series

VIVO DUAL DVI
512 MB GDDR3 256-bit

- 625MHz/1.5GHz
- 256-bit Memory Bandwidth
- Shader Model 3.0 support
- Microft® DirectX® 9.0c OpenGL® support
- CrossFire™ Ready
- Windows® Vista Ready

PowerColor X1600 XT
GameFX Board Series

VIVO DUAL DVI
256 MB GDDR3 128-bit

- 600MHz/1.4GHz
- 128-bit Memory Bandwidth
- Shader Model 3.0 support
- Microft® DirectX® 9.0c OpenGL® support
- CrossFire™ Ready
- Windows® Vista Ready

PowerColor X1300 PRO
GameFX Board Series

BRAVO VIVO
256 MB GDDR3 128-bit

- 600MHz/1.0GHz
- 128-bit Memory Bandwidth
- Shader Model 3.0 support
- Microft® DirectX® 9.0c OpenGL® support
- CrossFire™ Ready
- Windows® Vista Ready

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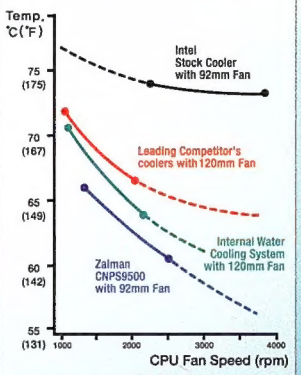
Endless Innovations

ZALMAN
Zalman Tech Co., Ltd.

The Art of Cooling Redefined

CNPS 9500 LED
Ultra Quiet CPU Cooler

Performance Comparison Chart



- CPU : Intel Pentium 4 550 (TDP 115W)
- Ambient Temperature : 30℃

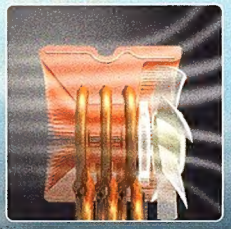
● Ultimate Perfomance

100% copper heatsink with aerodynamically optimized "tunnel" design for maximum cooling efficiency

Innovative patented heatpipe bending design for a heat transfer capability equal to 6 heatpipes with just 3 heatpipes

● Ultra Quiet Operation

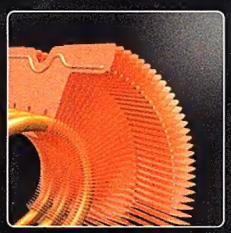
Ultra Quiet CNPS 92mm opaque fan with blue LEDs



Aerodynamically optimized heat sink for smooth airflow and minimal noise

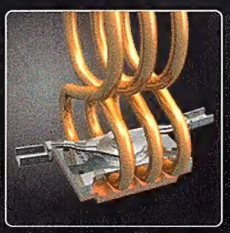
● Minimized Weight

Optimized heatsink layout for maximum cooling efficiency with minimal materials



0.2mm ultra slim fins for miniminzed weight and reduced airflow resistance

● Broad Compatibility



Intel Pentium 4 (Socket 775/478)

AMD Sempron/AMD64 (Socket 754/939/940)

Specifications

Dimensions (L X W X H)	85 X 112 X 125 mm (3.35 X 4.41 X 4.92 inch)
Heatsink Material	Pure Copper Base Pure Copper Fins Pure Copper Heatpipes
Weight	498g (17.56oz)
Dissipation Area	3,498cm² (542.19 inch²)
Fan Size	92 X 25 mm (3.62 X 0.98 inch)
Fan Operating Voltage	5~12V
Rated Current	0.35A
Max. Power Consumption	4.2W
Bearing Type	2-Ball Bearing
Fan Speed	1,350 - 2,600rpm ±10%
Noise Level	18.0 - 27.5dB ±10%
Connector	3-Pin
Fan Speed Controller	FAN MATE 2

CNPS COMPUTER NOISE PREVENTION SYSTEM

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